

Israel Thorneik Hunt. M.D. Dec 14 1870.

A
GENERAL SYSTEM
OF
SURGERY,
IN THREE PARTS.

CONTAINING THE
DOCTRINE and MANAGEMENT

- I. Of WOUNDS, FRACTURES, LUXATIONS, TUMORS,
and ULCERS, of all Kinds.
- II. Of the several OPERATIONS performed on all PARTS
of the BODY.
- III. Of the several BANDAGES applied in all OPERATIONS
and DISORDERS.

The Whole illustrated with Forty COPPER-PLATES, exhibiting all
the OPERATIONS, INSTRUMENTS, BANDAGES, and IMPROVEMENTS,
according to the Modern and most approved Practice.

To which is prefixed,

AN INTRODUCTION,

Concerning the *Nature, Origin, Progress, and Improvements* of SURGERY;
With such other PRELIMINARIES as are necessary to be known by the
YOUNGER SURGEONS.

Being a WORK of THIRTY YEARS Experience.

By DR. LAURENCE HEISTER,

Professor of *Physic and Surgery* in the University of HELMSTADT,
Fellow of the Royal Society, LONDON, and of the Royal Academy at PARIS, &c.

The SEVENTH EDITION, Translated from the AUTHOR's last Edition, greatly improved.

L O N D O N,

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T H E
EDITOR'S PREFACE
to the SIXTH EDITION.

THIS most excellent and elaborate Work, is so well known in the learned World, and has every where met with so favourable a Reception, that, to detain the Reader at present with any Encomiums on this Subject, would be vain and superfluous. But, as the judicious Author (who has not only his own Credit, and the Dignity of his Profession, but, what is infinitely more noble, the public Utility ever at Heart) has greatly improved and enlarged his Undertaking in succeeding Editions; the Proprietors of this Translation have, therefore, thought it their Duty to give a fresh Impression of it, enriched with all those useful and valuable Improvements. These Additions are dispersed almost every where throughout the Work; but are most large and copious in the important Branches of Lithotomy and Midwifry.

We have likewise inserted in this Edition two additional Plates, engraved from those of the Author's. And, that nothing might be wanting to complete it, the whole Translation has been revised, with great Labour and Attention, and particularly with an Eye to the Accuracy of the Pointing, which greatly assists the Clearness and Perspicuity of a Work, especially to the young Beginner, not yet versed in the Subject.—Upon the whole, we flatter ourselves, that we here offer to the Public, the most useful Work of its Kind now extant, thus carefully revised, and amply improved; which, on its first Appearance, not only led the Pupil through each Branch of the Practice, but was confessed, by the experienced and judicious Practitioner, to be a most complete, distinct, and comprehensive System of the whole Art of Surgery.

Since Dr. HEISTER published his System of Surgery, he has obliged the World with a large Collection of Cases in the several Branches of Surgery and Midwifry, which he printed in the *German* Language. This useful Work has been translated into *English*, at the Recommendation of the learned and ingenious Dr. PETER SHAW, *Physician in Ordinary to his Majesty*, who has been pleased, in the Preface, to declare it, to be “a very useful Work, containing a genuine Account of large Business, and a good History, not only of Dr. HEISTER's extensive Practice, but of the Improvements made in the several Parts of Physick and Surgery, during his own Time; and abounds with Improvements and useful Discoveries in the Course of his extensive Practice, during several Campaigns, and in many popular Cities of *Germany*. His ingenious Mind shines through the whole, as he describes not only the Cases wherein he was successful, but those wherein he failed.” And upon perusing it, Dr. SHAW found it so excellent, that he recommended it to be translated, believing it would prove highly serviceable to the Public.

T H E

TRANSLATOR'S PREFACE.

THE Translation of the Book before us, which now appears in the World, will obviate a Complaint frequently made among the junior Surgeons, and Pupils of this Art in *England, viz.* that they are in Want of a general System, capable of instructing at large one that is a Learner in Surgery, for the Execution of all the Branches of his Profession; and this, till now, might indeed be affirmed with some Justice. It is true, the several Branches of Surgery have been tolerably well handled by various Authors, at different Times, and in separate Treatises: Some have confined themselves to Wounds, Fractures, Luxations, Tumors, and Ulcers, which make the Subject of the first Part of the present System; others have written professedly on the Operations, Instruments, and Bandages; or miscellaneous Observations appertaining to the Practice of Surgery; and others have given us short Introductions to the whole; but in no one Book, except the present, do we meet with all these Branches treated in that ample, easy, and intelligent Manner, which is necessary for the first Information of Beginners, or the occasional Consultation of the more advanced. We have, in this Work, not only the best and most modern Methods of Practice used by the principal Surgeons of the skillfullest *European* Nations, but also exact Figures of their several Instruments and Bandages, with the Methods of using or applying them in all chyrurgical Cases whatever; the whole Doctrine of which is here explained in the minutest Circumstances; and brought down even to the lowest Capacities. In short, no Character of the Book can so well recommend it to the Reader as his own Perusal, and the Author's Preface following.

London, Oct. 1742.

T H E

T H E

AUTHOR'S PREFACE.

AFTER having studied Physic with great Assiduity above four Years in our *German* Universities, my Affections, being strongest for *Anatomy* and *Surgery*, led me to the then celebrated Professors RUYSCH and RAW, at *Amsterdam*, in the Year 1706; whose anatomical and chirurgical Demonstrations I diligently attended for about the Space of a Year. During which Time I was also employed in frequent Dissections, and in trying chirurgical Operations upon dead Subjects; in the mean Time omitting no Opportunities of being present at the Performance of any considerable Operation by these Professors, or by the other eminent Surgeons of the same City, as VERDUIN, BORTEL, KOENERDING, &c. By which Means, joined with an attentive Reading of the best Writers, I acquired a considerable Knowledge in Surgery.

But being desirous of all Helps to render myself still more expert and successful in the Practice of this Art, there being at that Time a sharp War in *Flanders*, betwixt the *French* and *Dutch*, in the Summer following, viz. in the Year 1707, I went from *Holland* to the *Dutch* Camp in *Brabant*, that I might inspect and observe the Practice of the *English*, *Dutch*, and *German* Surgeons, who there attended. Thus, through many Dangers and Hardships, I spent this whole Summer in the Hospitals of the Camp, for the Sake of Improvement. But in Autumn I went from *Brabant* to *Leyden*, and spent the whole Winter in attending the Lectures of the then celebrated Professors in that University, BIDLOO, ALBINUS senior, and BOERHAAVE: And thus I continued till the Beginning of the Summer 1708. After which, having taken my Degree of *Doctor*, I returned again to the Camp, where I found large Opportunities of learning and improving myself in Surgery, from the Multitude wounded, &c. in the several bloody Fights, particularly at the Siege of *Lisle*, and the Battles of *Audinarde* and *Wynendale*. Upon the Approach of Winter again, I was determined to settle in the Practice of *Physic* and *Surgery* in *Holland*, at *Amsterdam*, partly from

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from the Delight I had in the Country, and partly through the Sollicitations of the famous RUYSCH, who respected me as a Son. Here therefore I stayed the Winter, and Part of the ensuing Spring, teaching *Anatomy* and *Surgery* to Students and Gentlemen, as RAW had done before me, who was now rejected for his ill Conduct or Misbehaviour.

The following Summer, in 1709, I had still a strong Desire to follow the Camp, to become more and more perfect in the Practice of *Surgery*; and *Tournay* being at that Time invested by the confederate Army in *Flanders*, I was, by the Recommendations of my Friend RUYSCH, appointed Physician to the Camp-Hospital for the *Hollanders*. I had now an Opportunity of performing all the chirurgical Operations which offered in the Camps and adjacent Cities, which I generally executed with Success. After the taking of *Tournay*, the confederate Army marched to besiege *Mons*, near which Place the *French* Army was also assembled. That, however, did not prevent us from investing and taking the City; before which the numerous Army had such a bloody Battle, that the Wounded were brought in upon us in Crowds. Their Number continually increasing, from the uncommon Heat of the Combat, every Surgeon had now his Hands full of Business, and infinite Calls for the Practice of his Art: For the Wounded, on the Side of the *Hollanders* only, amounted to above Five thousand. I had here therefore an ample Occasion to extend the Bounds of my Practice, and was obliged to put on that Intrepidity of Mind, which CELSUS requires as an essential Qualification in a Surgeon; and for want of which, some, who are, in other respects, skillful Operators, do frequently miscarry.

After the Army had entered into their Winter-Quarters, and the wounded Men recovered, I returned again to *Amsterdam*, where I continued my *Anatomical* and *Chirurgical* Demonstrations this Winter as before. In the mean Time, I never refused my Assistance at the Operations of the other Surgeons there.

But in the Beginning of the Spring following, 1710, I was, beyond all Expectation, called by the Republic of *Noringberg* to teach *Anatomy* and *Surgery*, as public PROFESSOR in the University of *Altorf*. Being therefore unwilling to neglect this honourable Invitation, having obtained

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Leave from the Republic, I first made a Tour into *Great Britain*, where I was, from Spring to Autumn, collecting every thing new in the several Branches of *Physic*, and then, returning to *Norimberg* and *Altorf*, I assumed my new *Professorship*.

In this Station I was under a Necessity of teaching publicly, among the other Parts of *Physic*, that most ancient, necessary, and useful Branch of it which we call *Surgery*, and which I had before taught privately during the two preceding Winters in *Holland*. But in doing this I was much perplexed for want of a convenient Manual, or compendious System of the Art, to assist and inform those Learners who attended my Lectures. To our want of such a *Compendium* I also attributed the general Ignorance and Insufficiency of the young Surgeons and Students in this Branch of *Physic*, which at that Time universally prevailed, through *Germany* especially. And from the same Cause the generality of our Surgeons, being unequal to the more difficult Operations, were content with being able to cure a slight Wound, open a Vein or Abscess, or at most to set a Fracture, and reduce a Luxation; leaving those Disorders and Operations, which require the greatest Skill, to the Management of daring Quacks and itinerant Operators, with which *Germany* at that Time swarmed.

If any one examines the best Books, such as the *Microtechnia* of VAN HOORN, the *Operations* of NUCKE, &c. which were at that Time consulted not only by our Surgeons, but also by our University-Professors, for teaching and learning the Art, it will readily appear how imperfect and insufficient they are to give a just Notion of any one Branch, much more of the whole System or Body of *Surgery*. Since they describe only a few of the Operations, and those too imperfectly; taking little or no Notice of the Doctrine and Treatment of Wounds, Fractures, Luxations, Tumors, and Ulcers, which make the most considerable Part of *Surgery*, and in which a Learner ought to be the most fully instructed. It is true, the Works of GUIDO CAULIACUS, AQUAPENDENS, PAREY, SCULTETUS, SOLINGEN, and some other Writers of the last Century, are very full and explicit in all or most of the Operations, and the five Kinds of Disorders beforementioned. But even in these we must not expect to find the many Improvements, Emendations, and Discoveries, made by the Moderns: And their Practice being
mostly

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mostly obsolete, they must consequently be allowed to be unfit for the Instruction of Learners. And it is an Objection to many of our Books in Surgery, of a more modern Date than the preceding, that they have been either compiled by Physicians, little conversant in chirurgical Dissections and Operations, as those of BARBET, VERDUC, BONTECK, DOLEY, BLANCARD, CHARRIERE, JUNCKEN, VAUGUION, LE CLERC, &c. in which many of the old Errors are continued, and not a few Things stated otherwise than will be found in Practice: Or else they have been restrained to but one or two Subjects only, as the Bones, Wounds, Tumors, Bandages, Operations, &c. besides their being written either in a rude, or a foreign Language, unknown to most of our Surgeons.

These were chiefly the Motives that first induced me to attempt the Composition of a chirurgical System, to be subservient to my own Lectures and Auditors: In doing which, I endeavoured to take in all the more useful Part both of our ancient and modern Writers in every Branch of Surgery; rejecting what appeared useless or obsolete, and comparing or correcting the whole conformably to my own Experience, and what I had seen in the Practice of the Art under many of the most skilful Surgeons and Physicians. And thus, from time to time, I endeavoured not only to correct and complete my Collections and Remarks, so as to take in every, even the minutest, Part of Surgery; but also I digested and disposed the whole in the Method which appeared to me the most natural, and the best adapted both for the Teacher and Learner.

These my first Labours I writ originally in *Latin*, in which Language they were also delivered to my Hearers, and permitted to be *transcribed* by them: But, considering the immense Fatigue that this Method of obtaining it gave the Student, with the great Loss of Time, which he might have otherwise employed to more Advantage, I was at length determined to *publish* it in *Latin*, in the Manner I had then composed it. Yet so great was the Ignorance of our *German* Surgeons, at that Time of Day, as well in the *Latin* Tongue as in their own Profession, that (my Work) being chiefly intended for them, I now judged it would be more useful to print the Book in our native *German*; for then both the learned, and ignorant of the *Latin*, might have the same Benefit of it. Accordingly I translated and sent it to the Press in the Year 1717, and in the Year following, 1718, it was published

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as my *Surgery*, in 4to, at *Norimberg*, being illustrated with Copper-plates, exhibiting the best Instruments, &c. And from this time it is that we have had better or more expert Surgeons in *Germany* than before; many of which have since often declared to me, that they had drawn most of their Knowledge from my *Surgery*.

I intended, soon after, to have published the Book in *Latin*, for the Sake of *Foreigners*; but, in the Year ensuing, I received a most gracious Call to the public Professorship of *Anatomy* and *Surgery* in the *Julian* University of *Helmstadt*, from his *Britannic* Majesty, as Duke of *Brunswick* and *Lunenburg*, under whom the University flourishes, and is liberally supported; so that what with the Care and Trouble of packing up, and removing my Goods, and the Fatigue of a long Journey, added to the Multitude of Business, and many Avocations consequent on my new Office, I have been obliged to delay the *Latin* Edition of my *Surgery* much longer than I ever thought or designed. However, the *Germany* Impression was sold off in a little Time, and the Bookseller urging for a second Edition, as there were several Improvements made lately in *Surgery*, particularly in *Lithotomy*, I therefore revised, corrected, and enlarged the Book, according to the later Discoveries, and my own recent Observations since made, so as to fit it then for a second, and some time after for a third Edition. But then this, with other Avocations in the mean time, prevented me from completing the Work in the learned Language, for the better Sort of Readers, so as to make it correspond to the Performances of foreign Authors, with which our *German* Surgeons were unacquainted.

But being at length solicited, as well by many learned Physicians and Surgeons of other Nations, as by my Bookseller at *Amsterdam*, to publish my *Surgery* in *Latin*, for the Advantage of *Foreigners*; and being unwilling to deny the Request, I have now, notwithstanding my academical and practical Business, made shift to print it in that Language, in many Places much enlarged and amended beyond any of the preceding Editions. And I hope it may be a Means of instructing young Surgeons in all the Branches of their Profession, according to the best modern Discoveries and Improvements which have been made in the Art. I have here endeavoured to present them with the whole Body of *Surgery* together, that Learners especially may not have their

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Knowledge

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Knowledge to seek in many different Books, by turning over some upon Wounds; others upon Fractures, Luxations, Tumors, or Ulcers; and others, again, upon Operations, Instruments or Bandages: All which, I think, are here sufficiently explained, not only for the Instruction of Learners, but all the Purposes of the more advanced.

Whether I have succeeded in this Task, must be left to the Determination of more prudent and impartial Judges; but this I may be allowed to say, that I have used my best Endeavours to promote the Glory of God, and the public Good, by these Labours of their

Helmstadt,
Jan. 10, 1739.

Devoted Servant,

THE AUTHOR.



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A GENE-

A GENERAL INTRODUCTION TO SURGERY.

Of the Nature, Constitution, Origin, Progress, Improvement, and Division of SURGERY ; and of other Things in general, which are principally necessary for STUDENTS in SURGERY to be acquainted with.

I. **T**HE principal end of *Physic* is to prevent or relieve the Disorders of the human Body. This the first Physicians endeavoured to effect by three means, either by *Food*, *Medicines*, or the *Application of the Hand*^a; or by all together, if the Case required it: which method, reason and experience teach us, is absolutely necessary at this time. And of these three branches of this salutary Profession, they called the first *Diet*, or *Dietical* (διαίτητικὴ); the second *Pharmaceutical* (φάρμακωδότης); and the third *Chirurgical* (χειρουργική). For since the end of *Physic* could by no means be always obtained by *Diet* and *Medicine* alone, (though they are of very great service in preserving and restoring the Health of Mankind), but Manual Operation is also found sometimes to be absolutely necessary; it is plain therefore that this branch of *Physic*, which is called *Surgery*, is very necessary to mankind: more especially, as it appears, that by this means many grievous Disorders are relieved, as Wounds, Fractures, Luxations, and several others, where *Diet* and *Medicine* would afford very little, and sometimes no help at all. But that the excellence and necessity of this Art may appear more clearly, it may be necessary to observe, that other Arts only conduce to the conveniencies of life, but the Art of *Surgery* is frequently necessary for the preservation of life, and the continuance of health, the most valuable treasure we can be possessed of. This necessity appears more particularly in dangerous Wounds received in war, skirmishes, or sieges^b, where many brave men must necessarily perish

^a See CELSUS, Præf. Lib. I. pag. 3. Edit. Almelov. & Patav.

^b Of the Use and Excellency of Surgery, see VESALIUS, in præfat. Corp. Hum. fabric. GASSNER, in Script. opt. Chir. CYPRIAN, Orat. encom. in Chirurg. SCHELLAMER, Præf. de Tumor. and KESSELRING, in Dissert. de meth. *Fourbertian*, who treats very learnedly of the flourishing State of Surgery, and contends, that it is equal, if not preferable to, *Physic*, from the great Certainty and Rationality of its practice.

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INTRODUCTION.

from loss of blood, and other causes, unless they were restored, and snatched as it were from the jaws of Death, by the skill of their Surgeons. And no doubt the better opinion the Soldiers conceive of their Surgeons, the more spirits have they for the combat, having good confidence that the Wounds they receive shall be properly treated, and their Lives preserved. And from hence, because Surgery is chiefly exercised in the treatment of Wounds, it is called by the Germans the cure for wounds (*Wund-Arzeney*) not as if Wounds were the sole objects of Surgery, but as it is of more particular and frequent service in cases of that kind.

Surgery,
what.

II. "Surgery, says CELSUS^a, is that branch of Physic which informs us how "to cure or prevent Disorders by the assistance of our Hands or Instruments, "or by the application of external Remedies," as disorders are frequently prevented by Bleeding, Scarifying, opening of Issues, and by Setons, &c. Since therefore Surgery is properly the Work of the Hand, it is very justly called by the Greeks *Χειρουργία*, from the two Greek words of that signification, *Χειρ* and *Εργον* from whence the person also skilled in this Work was called a *Chirurgion*. But He, whose office it is to cure disorders only by administering Medicines internally, and by prescribing rules for the regulation of the Diet, is at present in Latin called *Medicus*: though this is a modern distinction, and unknown to the Ancients, among whom both offices were performed by the same person, called *Ιατρός*; as appears plainly by the writings of HOMER, HIPPOCRATES, CELSUS, and many others.

It may be
called a Sci-
ence and an
Art.

III. Some call Surgery a Science, others an Art: but, in my opinion, it will claim either appellation. For it may be called a Science, because the Student in Surgery, before he is skilled in the method of healing, must have acquired the Precepts or Foundation of what is to be done towards discovering and remedying disorders that are to be relieved by the Assistance of the Hand, from Anatomy, Physics, and Mechanics: for without this knowledge he would not only go very idly to work, but would do more harm than good to his Patients, and consequently to the Public. It also well deserves the name of an Art, when any one is so well versed in the Elements of this Art, that he is able to preserve the Body sound, as well as to relieve it when it is otherwise. Hence we very properly term those skilled in the Art of Surgery, who are expert in healing Wounds, replacing fractured and dislocated Bones, and understand the right methods of treating other Disorders which require the assistance of the Hand or Instruments. From hence, I imagine, arose the distinction which some have made between *theoretical* and *practical* Surgery. Thus Surgery was considered, when ranked under the first denomination, as a Science: as when a man has learnt and understands the Rules, and the Reasons upon which those Rules are grounded, which teach the best Methods of treating Disorders that call for the Surgeon's hand, and in what manner Operations (as they are vulgarly called) are to be performed; but never attempts the performance of any of these Operations, whether they are dividing, amputating, cauterising, or reducing Bones, or of any other kind. This Science we call *Medical Surgery*. And this branch of Surgery, at least, all regular Physicians ought to be well acquainted with; that they may be of service to the Surgeons and their Patients,

^a Lib. I. Præfat. pag. 3. and Lib. VII. in the beginning of the Preface.

by being able to give prudent advice in disorders of this kind. *Surgery*, when it falls under the second denomination, and is termed *practical*, signifies the exercise of it, or the *Art* of performing Chirurgical Operations, of replacing, tying, cutting, extirpating, dividing, cauterising, &c. The *Practical Surgeon* is well instructed in the art of managing his Hands and Instruments dextrously in the performance of such Operations as the necessity of the case shall require. Much the greater part of the modern *Physicians* have been content with the knowledge of the former part of *Surgery*, leaving the execution of the latter, which is much to be lamented, to unskilful Quacks and Montebanks. This happens partly because the Disorders that are curable by the prudent administration of Medicines internally, and a well-regulated Diet, which more immediately come under the province of the Physician, are so numerous, and withal so intricate, as to be a sufficient exercise for his whole Study; and partly because Cures which are to be performed by the Hand, especially those which are attended with danger or severity in the execution, require a singular fortitude and firmness of resolution; or, as the elegant CELSUS expresseth it^b, A Mind intrepid, divested of Tendernefs, and unmoved by the Shrieks of the suffering Patient: Which is to be met with in very few, though they may be perfectly well acquainted with every thing that ought to be done. But whosoever desires to be a perfect *Surgeon*, must be a thorough Master of his Profession under both heads, as a *Science* and as an *Art*: and in such a manner that the *theoretical* Part, or knowledge of the Elements, (in which *Anatomy* claims the first place) should precede the exercise of the Art. For if any one should be bold enough to proceed in the contrary method, and invert this rule, by undertaking to perform Operations, especially those of the more difficult kind, before he had made himself well acquainted with *Anatomy*, the nature of Diseases, and what is proper to be done towards removing them; of necessity he will do great harm to those entrusted to his care, and destroy more than he will save; though this is unhappily every where practised by bold daring Fellows, to the great detriment of mankind, and to the disgrace of this truly noble Art. For “ Knowledge^c ought to direct the Hands, and shew them what is proper for “ them to perform.” Therefore if any *Surgeon* has been long in Practice, and, as they are fond of terming it, is a *Man of great Experience*, and is not thoroughly versed in *Anatomy*, and the Institutions of *Surgery*, his actions are always doubtful and uncertain, and are ever obnoxious to multiplicity of dangers. Therefore it is necessary for the good *Surgeon* to be a thorough Master of both; but he whose comprehensive Knowledge takes in all the other branches of *Physic*, as many amongst the ancient and modern *Physicians* have done^d, is by so much the abler and more accomplished *Surgeon*.

IV. The end of *Surgery*, as appears by what we said above at N^o I. is three-^{The end of} fold: 1. *To preserve mankind in a sound State*, in the manner we explained it at ^{Surgery.}

^a This is very rarely the case in *England*, but too common in *Germany*.

^b Lib. VII. in *Præfat.*

^c CELSUS speaks more largely of this Lib. I. in *Præfat.*

^d As ÆSCULAPIUS, PODALIRIUS, MACHAON, HIPPOCRATES, GALENUS, CELSUS, ÆTIUS, ÆGINETA, ORIBASIUS, GUIDO CAULIACUS, SALICETUS, VESALIUS, FALLOPIUS, MARIANUS SANCTUS, JO. DE ROMANIS, VAROLIUS, CABROLIUS, FABR. AB AQUAPENDENTE, M. A. SEVERINUS, HILBANUS, SPIGELIUS, GLANDORPIUS, GEIGERUS, SCULTETUS, MARCHETTUS, ROLFINCIUS, WEPFERUS, MURALTUS, SOLINGENIUS, RUYCHIIUS, BIDLOUS, NUCHIUS, GROENVELTIUS, CYPRIANUS, BOHNIVS, BRUNNERUS, RAVIUS, LEVSDENIUS, &c.

INTRODUCTION.

Nº II. 2. *The Restitution of a sound State*; that is, the cure of diseases by the Assistance of the Hands. Or, 3. *To preserve the Life of a Man*, though with a maimed and wounded Body, if it is impossible to render it entire. This third end is chiefly obtained by the amputation of sphacelated, cancerated, or carious Limbs; so in Cancers, Schirrus's, old Ulcers, and other such like incurable Diseases, and in several Disorders of the Head, especially in weaknesses of the Eyes and Ears, to prevent their growing worse, it is usual to order Issues, Setons, frequent Blood-letting, Blistering, &c. though a perfect Cure is not perhaps to be looked for. And therefore under this head may be ranked inveterate *Herniæ*.

Auxiliaries
of Surgery,
what.

V. The *Auxiliaries* or *Means* which *Surgery* makes use of to obtain the ends we have been discoursing of, are chiefly the *Surgeon's Hands* and proper *Instruments*. For as often as a fractured or dislocated Bone is to be reduced, a Vein to be opened, a Stone to be extracted, or a Cataract depressed, proper Instruments are always necessary. But that every thing may go on with more speed, ease, and safety, the administration of proper internal Remedies, and the regulation of Diet, will never be neglected, in any of the foregoing cases, by a prudent *Surgeon*; which confirms the saying of CELSUS, "a That all the parts of Physic are so intimately connected, that it is impossible to separate any one of them entirely from the whole." And in another place, "I, says he, can easily conceive one man to be capable of performing all the offices of Physic, and, where they have been divided, think him praise-worthy that unites them in himself."

Origin of
Surgery.

VI. The strong connection that there is between *Physic* and *Surgery*, is, in my opinion, a persuasive argument that the Origin, Progress, and Fate of both, were always the same. Though, to say truth, I cannot help believing with CELSUS^c, and others, that *Surgery* is more ancient than any other branch of *Physic*, and near coeval with Mankind, and therefore the true Parent of *Medicine*. The nearer Mankind was to its first original, at so much the greater distance were they, as CELSUS observes, from Luxury and Debauchery, and of consequence so much the farther removed from internal Diseases. The native strength of Man, as yet unhurt by Intemperance, stood in no need of internal Aids. But on the other hand, even in the earliest times, Men were as liable, as we are to this day, to external Injuries, which require the assistance of the *Surgeon's Hand*. For who in those days was secure from falling, or from Fractures of the Bones, which are the consequences of such accidents; from the Bites of wild Beasts; or from the Wounds of an open or an insidious Enemy? Since in the very first Ages men waged war with each other, can it be reasonably supposed that they were always free from Bloodshed, fractured and dislocated Bones, &c. As therefore it cannot be doubted, but that by the direction of Nature, who taught them to extract Thorns, and to tie up Wounds, to prevent a large Effusion of Blood, they by degrees were used to receive assistance from the hand of some kind of Instruments; and if by chance, after many repeated experiments of this kind, any thing should be found to answer the desired end, diligent Men would certainly retain it in their Memories, and mark

^a In Præfat. Lib. V. item SCRIBONIUS LARGUS, Cap. LXVIII.

^c In Præfat. Lib. I.

^b In Præfat. Lib. VII.

it down. which being repeated with success in similar cases, was handed down to posterity. So this salutary Profession took its rise from small, and those rude, beginnings and vulgar Experiments, till by degrees it received Improvements, and was brought to its present perfection by the Industry and Sagacity of ingenious Men.

VII. By as much as we can collect from ancient History, the *Chaldeans* and *Egyptians*, who were the first cultivators of Science, as we learn from the Scriptures, found *Surgery* naked and in her infancy, enriched her with new Experiments, and laid her down Rules and Institutions to walk by. And afterwards *Surgery* was still much farther enriched by the *Greeks*, those ancient and noble Patrons of Knowledge. *APOLLO* and his Son *ÆSCULAPIUS* were chiefly celebrated as Surgeons in those ages, who for their Sagacity in cultivating this Science, gained to themselves so great Applause, that they were reckoned among the number of the Gods. After these came *PODALIRIUS* and *MACHAON*, two sons of *ÆSCULAPIUS*, who accompanied *AGAMEMNON* to the *Trojan War*, and were of great service to the Army. But *HOMER* never takes notice of them as being serviceable in the Plague or other kinds of Distempers, but only as Persons skilful in healing Wounds by the application of Instruments and Medicines. From whence it appears, that they were only expert in *Surgery*, and that it is the most ancient Branch of *Physic*. We read of *CHIRON* the *Centaur*, and other *Surgeons* after them, who equalled them in reputation, but the monuments of those days are long ago entirely defaced by time. *HIPPOCRATES* the *Coan* seems to have far exceeded all the rest in sagacity and success; *CELSUS* declares of him, "that he was not only celebrated for Wisdom and Art, but for Eloquence also." He inherited *Surgery* by descent, being sprung from the race of *ÆSCULAPIUS*. With no less judgment than assiduity he formed a compleat System of the Experiments and Rules of his Ancestors, with their various and elaborate Methods of Cure; which he greatly improved, through the assistance and directions of *DEMOCRITAS*, by his constant and indefatigable attention to the study of *Human Anatomy*^b. For which reason, they are by no means deceived who have pronounced *HIPPOCRATES* the Father of all Branches of *Physic*, but more particularly of *Surgery*. The Writings of this great Man, notwithstanding they are the most ancient, so far exceed all the rest, that at all times they have been laid down as examples to all Professors of *Physic*.

VIII. The *Greeks*, by their strenuous application to the study of *Surgery*,^{Proficiency of the Romans, Greeks, and Arabians in Surgery.} excited a desire in the *Romans*, and at the same time in the *Egyptians*, to give encouragement to the same Art. "About this time, a little before the birth of *CHRIST*, *PHILOXENUS* was eminent in *Surgery*, who, according to *CELSUS*, wrote several Volumes upon this Branch of *Physic*. *GORGONUS* also and *SOSTRATUS*, and *HERONES*, and the two *APOLLONIUS's*, and *AMMONIUS ALEXANDRINUS*, and many other famous men, all enriched this Science with something new. At *Rome* also, saith the same Author, there were Professors of great note, especially *TRYPHON* the Father, and *EUELISTUS* the Son of *PHLEGES*, and, as we may gather from his Writings, the

^a Vide *CELS.* Lib. I. Præf.

^b As *CELSUS* testifies, Lib. I. Præf.

^c See *CELSUS* in Præf.

" principal

“ principal of all, MEGES; all of them by various Emendations still added
 “ Improvements to this Science.” But the Writings of these men are not transmitted to us. In the Ages next after CHRIST, CELSUS acquired the greatest name amongst the *Latin Writers*, (on whom we have bestowed repeated Encomiums) but among the *Greek Writers*, GALEN, PAULUS ÆGINETA, ÆTIUS, and ORIBASIVS; whose Works are still extant. But after this, in the subsequent ages, the barbarous Nations began to over-run the whole Earth, and Surgery was so far from encreasing, that it received the same fate with all other Branches of Science, and suffered under the common calamity. Therefore it is no wonder that those times produced no one to whom Surgery was indebted, if you except only RASES, HALY ABBAS, ALBUCASIS, and AVICENNA, who flourished in *Arabia* about the XIth or XIIth Century. It is to be observed though by the way, from GUIDO DE CAULIACO*, the Physicians at this time first refused to undertake the performance of any *manual Operation*, though indeed in CELSUS’s time there were some who separated Surgery from Physic.

Industry of
 Surgeons of
 a later date.

IX. In the XIIIth and XIVth Centuries, when the clouds that had overshadowed all Science began to disperse, Surgery also again emerged with the rest, and was cultivated both by Physicians and Surgeons. At first arose BRUNUS, THEODORICUS, SALICETUS, LANFRANCUS, ARNOLDUS DE VILLA NOVA, and many others equally eminent: but afterwards, in a still more conspicuous light, shone that true Restorer of Surgery GUIDO DE CAULIACO, DE LARGELATA, JO. DE VIGO, VESALIUS, FALLOPIUS, ANDREAS A CRUCE, ARCAEUS, MARIANUS SANCTUS, ANGELUS BOLOGNINUS, BERENGARIUS CARPUS, ALPHONSUS FERRIUS, JOANNES TAGOLTIVS, BARTHOLOMAEUS, MAGGIUS, PARAEUS, SCHILLHANS, GERSTOFF, BRUNSVIC, RYFF, and others, who greatly contributed, as appears by their Writings, to the Improvement of Surgery.

Of the Moderns.

X. At length in the last and present age, by the industry first of the *Italians*, *French*, *Germans*, and more latterly also of the *English*, Surgery has been so wonderfully enrich’d with extraordinary Inventions and Observations in *Anatomy*, *Mechanics*, and *Physic*s, and with elegant Instruments and new methods of Curing, that it seems to want little or no addition to raise it to its highest state of Excellency and Perfection. But although I purposed now to give a regular account of those by whose labours Surgery has gained the fruits it at present enjoys, yet since the number of those is so large, let it suffice for the present to reckon up the principal of them; leaving the enumeration of the rest to another opportunity. In this rank we may reckon FABRICIVS AB AQUAPENDENTE, FABRICIVS HILDANUS, M. A. SEVERINUS, SPIGELIVS, MARCHETTUS, GLANDORPIUS, JO. SCULTETUS, FELIX WURTZIUS, GUILLEMEAU, CÆSAR MAGATUS, CASP. TALIAACOTIVS, GOUSMELINUS, RONHUYSIUS, VAN NEEKEREN, CORN. SOLINGEN, NUCHIVS, BURMANNUS, MAURICEAU, TOLET, VERDUCCIUS, BIDLOUS, RUYSCHIVS, BOHNIUS, CYPRIANUS, RAVIVS, MASSIERUS, DIONIS, PETIT, WISEMAN, DOUGLAS, CHESELDEN, GARENGEOT, MARINUS, TURNER, MORAND, LE DRAN, and many others, whom you will find among the *Chirurgical Writers*.

* See his Chirurgical Works.

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XI. Before we proceed farther, I think it will be of service to the Students in Surgery, to inform them of the best Writers that have treated of particular parts of Surgery, and have either handled these separately, or at least with superior success: in describing of these I shall observe, as near as I can, the same order, in which this book is disposed. And first, the following Authors have treated of the five principal parts of Surgery, to wit, *Wounds, Fractures, Luxations, Tumors, and Ulcers*; VESALIUS, TAGULTIUS, ANDR. A CRUCE, FABRIC. AB AQUAPENDENTE, then CORTESIUS, PEC CETIUS, WISEMAN, MUNNICK.

XII. The following Writers upon *Wounds* in general well merit reading; PARÆUS, ARCÆUS, FABRICIUS AB AQUAPENDENTE, GLANDORPIUS, MAGATUS, BELLOSTIUS. Upon *Wounds of the Head* in particular; HIPPOCRATES, CELSUS, CARPUS, ARANTIUS, PAVIUS, MILLERUS, SCHULTZIUS, WALTHERUS, and ROHAULT, a modern Frenchman. On *Diseases of the Eyes*; FALLOPIUS, JO. LANGIUS in *Ephemerid. N. C. Cent. V. & VI.* ST. YVES. On *Wounds of the Breast*; FUMANELLUS, PECHLINUS. On *Gunshot Wounds*; PLAZZONUS, MAGGIUS, FERRIUS, ROTA, PARÆUS, FALLOPIUS, GUILLEMEAU, HILDANUS, BOTALLUS, BURMANNUS, TASSIN, VERDUC, VAUGUION, CHARRIERE, and, tho' last, not the least eminent, LE DRAN. Of *Tents*; BAIETUS. Of the *Abuse of Tents in Wounds*; MAGATUS, BELLOSTIUS, and a late French piece of CHABERT's, and of LUPUS in *Italian*, who have maintained that Wounds should seldom be kept open by Tents. Useful *Observations on Wounds* have been published by SCULTETUS, BELLOSTIUS, SCHWARTIUS, DE LA MOTTE, CHABERT, LE DRAN: The best discourses on *Mortal Wounds*, and the method of discovering them to be so, have been written by BOHNIUS, TEYCHMEYERUS, ZACCIIAS, AMMANNUS, VALENTINUS, ZITTMANNUS, FRID. HOFFMANNUS: To the same purpose is a book whose title is, *The Art of forming Prognostics in Surgery*, in French, and BLEGNIUS upon the same subject.

XIII. On *Fractures and Luxations*; PARÆUS, AQUAPENDENS, HILDANUS, VERDUC, in a particular volume on this subject; LE CLERC in his *Osteology*; PETIT's *Art of curing the Diseases of the Bones*, in French; PALFINUS, in Dutch. On *Fractures of the Cranium*; HIPPOCRATES, CELSUS, CARPUS, BERENGARIUS, CORTESIUS, PAAW, and the Authors above recited, who have discoursed on Wounds of the Head.

XIV. On *Tumors*; INGRASSIUS, FALLOPIUS, ARANTIUS, SAPORTA, M. A. SEVERINUS, SCHELHAMMER, CALVERS, MAUBEC, in French. On *Suppuration*; LAZERME. On *Abscesses*; SEVERINUS. On the *Carbuncle and Pestilential Bubo*; FALLOPIUS, GEMMA. On *Œdema and Schirrus*; HARRIS. On *Fungous Tumors of the Limbs*; SLENOGTIUS. On *Gangrene and Sphacelus*; HILDANUS, KOENERDING, HARRIS. On *Burns*; HILDANUS. On a *Cancer*; ALLIO, GENGROU, HELVETIUS, HARRIS, and much earlier TEXTOR. On *Ulcers*; TAGULTIUS, BONONINIUS, FALLOPIUS, AQUAPENDENS, VERDUC, LE CLERC. On *Caries of the Bones*; PETIT. On a *Spina Ventosa*; SEVERINUS, PANDOLPHINUS, MARCHETTUS, and WALTHER, in High Dutch.

XV. The best Authors on *Chirurgical Operations* in general, are CELSUS, ÆGINETA, PARÆUS, FABR. AB AQUAPENDENTE, SOLINGEN, NUCHIUS, VERDUC, VAUGUION, CHARRIERE, DIONIS, PAFYNUS, MASSIERUS, GARENGEOT, MARINUS, LE DRAN, SHARPE.

XVI.

Of Blood-
letting, and
Operations
of the like
nature.

XVI. On *Bleeding* in particular, besides many others, you will find BOTALLUS, P. P. MAGNUS, SCHMID, JONDOT, VERNA, MELLIUS, CRONE, HARRIS, SILVA, CHEVALIER, HECQUET, QUESNAY, MARTIN. On *Bleeding oftener in the Jugular Vein*; TRALLES. On the *Aneurism*; BARTHOLIN, HORN, HARRIS. On *Infusing Humours into the Blood*; MAJOR, ETTMULLER, ELSHOLZIUS. On *Transfusion*; LOWER, STURMIUS, SANTINELLUS, MAFRIDUS, MARKLINUS, BURMANNUS.

Of Operati-
ons which
are perform-
ed on various
parts,

XVII. Of *Inoculation of the Small Pox*; MAITLAND, PILARINUS, LE DUC, VATERUS, WREDEN, HARRIS. Of *Cupping and Scarifying*; CELSUS, GALEN, MAGNUS, BOTALLUS, MANNUS, MELLUS. Of the *Abuse of Cupping in Putrid Fevers*; AQUAPENDENS. Of the *Egyptian Method of Scarifying*; ALPINUS, STAHLIUS. Of *Leeches*; GALEN, MAGNUS, HEURNIUS, STAHLIUS. Of *Puncture with a needle after the manner of the Japonese*; RHYNE, and KOEMPFERUS. Of *Issues*; GALVANUS, in *Italian*; GLANDORPIUS, RESTAURANT, and SCHORETUS, in *High Dutch*. Dissertations on this subject have been written by ALBINUS, SCHELLHAMMERUS, SCHACHERUS, FR. HOFFMANNUS, HILSCHERUS, and others. On *Cantharides*; GEYERUS, ALBINUS, WEDELIUS. On the *Use of Blisters*; CAIUS, NENTERUS, FR. HOFFMANNUS, LAETIUS A FONTE, and HERCULES SAXONIA. On *Cauteries*; ALBUCASIS, CAPIVACCIIUS, GAVASSETIUS, SEVERINUS, COSTÆUS, MAGNUS, FALLOPIUS, FIENUS, BARTHOLINUS, BAUHIUS, SLEVOGTIUS. On the method of using the *Indian Moss (Moxa)*; TEN RHYNE, CLEYERUS, VALENTINI, LE TEMPLE. Of *Atheromata and Steatomata*; GORTESIUS, JO. LANGIUS, ELSHOLSTIUS. Of the *Meliceris*; HILDANUS, SEBIZIUS. Of *Encysted Tumors*; SLEVOGTIUS. Of *Extracting foreign Bodies from Wounds*; BIDLOO. Of *Amputation of the Limbs*; FIENUS, HILDANUS, HOFFMANNUS, HILSCERUS. Of a *new Method of taking off Limbs*; JONGE, VERDUIN, RUYSCHIIUS, KOENERDINGIUS, SALZMANNUS.

Operations
on the Head.

XVIII. Of an *Issue upon the Coronal Suture*; SLEVOGTIUS. Of *Arteriotomy*; FIENUS SEVERINUS, ALPINUS, SCHEURLIUS. Of the *Hydrocephalus*; CORTESIUS. Of *Trepanning*, and particularly of the difficulties that attend that Operation; FIENUS, BOHNIUS, COSCHWITZIUS.

On the Eyes.

XIX. Of *Disorders of the Eyes*; BARTISCHIIUS, who has very accurately delineated many of the Diseases of the Eyes; GUILLEMEAU, READ, COWARD, MAITRE JEAN, KENNEDY, ST. YVES. Of the *Trichiasis*; HEISTER. Of *Scarification of the Eyes*; MANCHARTUS, PLATNERUS. Of the *Fistula Lacrymalis*; ANELLUS, HEISTER, MELLIUS, in *Italian*, PLATNERUS. Of a *Cataract*; MAITRE JEAN, BRISSEAU, WOLHUSIUS, HEISTER, WIDEMANNUS, MARINUS. Of the *Hypopion*; BIDLOUS, and MAUCHARTUS, who likewise published treatises on the *Ectropion*, the *Fistula in the Cornea*, the *Empyema*, and other Diseases of the Eyes.

On the Nose
and Mouth.

XX. Of a *Polypus of the Nose*; GLANDORPIUS. Of the *Hair Lip*; MARINUS. Of *Disorders of the Teeth*, and the Methods of remedying them; GUILLEMEAU, STROBELBERGERUS, CRONE, and FRAUCHARD, a *Frenchman*, who lately wrote a Treatise called *Le Chirurgien Dentiste*. Of the *Epulis and Parulis*; SCHELLHAMMERUS.

On the Neck
and Breast.

XXI. Of *Laryngotomy*; CASSERIUS, MOREAU, FIENUS, DEKKERUS, MONAVIUS, FONTANUS, MASSIERUS. Of *Strumæ and Scrophulæ*; LAURENTIUS, BROWNE, GIBBS. Of *Setons*; GULVANUS, JO. FRANCUS, WEDELIUS, METZGERUS.

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GERUS. Of the *Cancer of the Breasts*; see above, under the *Head Cancer*. Of *Gibbosity*; WEDELIUS.

XXII. Of a *Paracentesis*; there are several academical Theses extant upon this Subject, by MEIBOMIUS, ALBINUS, SLEVOGTIUS, HENNINGERUS. Of the *Cesarean Birth*; ROSSETUS, BAUHINUS, DOERING, HILDANUS, BULEAU, RAYNAUDUS, FIENUS, LANKISCHUS, CYPRIANUS, SLEVOGTIUS. Of *Hernia*; PETRUS FRANCUS, GEIGERUS, LE QUIN, LAUNAY, BERENGER, VON HAMMEN, WIDEMANNUS; HARRIS, HOUSTON, in *English*; JO. SERMES, in his Book of *Lithotomy*, in *Dutch*, and divers academical Theses; in particular upon the *Hernia Incarcerata*, by MAUCHART; on the *Crural Hernia*, by KOCHUS; on the *Enterocoele*, by ROLFINCUS and PETERMANNUS; on the *Sarcocele*, by MARINUS; on the *Hydrocele*, by the same; and on the *Abuse of Kelo-*
tomy, HEISTER.

XXIII. Of a *Phimosis* and *Paraphimosis*; WEDELIUS. Of the *Closure of the natural Passages*; WIERUS. Of *Imperforations*; WEDELIUS. Of *Hypospadias*; LAVATERUS. Of *Passing the Catheter*; MEIBOMIUS, MARINUS. Of a *Stone in the Urethra*; MARINUS. Of a *Caruncle in the Meatus Urinarius*; FERRIUS, LACUNA, BENEVOLUS. Of *Fistula in the Urethra*; HILDANUS, MARCHETTUS, BECKERUS.

XXIV. Of *Lithotomy*, and particularly of what they call the *great Apparatus*; MARIANUS SANCTUS, HILDANUS, TOLETUS, GROENFELD, ALOHISIUS, MARINUS, CALLOTUS. Of the *lesser Apparatus*; CELSUS, ALBUCAZIS, CAULIACO; but it was afterwards laid aside; yet not long since MARINUS, an *Italian*, defended it in some particular cases, though by others it is altogether rejected. Of the *Highb Apparatus*; PETRUS FRANCUS, ROSSETUS, JO. DOUGLAS, CHELSEN, MIDDLETON, MORAND, J. SERMES, PROEBISCHUS, and HEISTER. Of FRERE JACQUES's *Method*; MERYUS, LISTERUS, DIONIS. Of RAU's *Method*; ALBINUS, HERTIUS, and JAC. DENYSIUS. Of the *Lateral Operation*; JAMES DOUGLAS. Of the *different Methods of cutting for the Stone*; PYE, an *Englishman*, and LE DRAN, a *Frenchman*; and SCHEFFERUS, and HERTIUS, in their Academical Theses, and others. Of FOUBERT's *Method*; KESSELRING. Of the *Methods of curing the Stone*, invented by FOUBERT, GARENGEOT, PARCHET, LE DRAN, and LE CAT; GUNZIUS. Of the *Abuse of Tents after Lithotomy*; HILDANUS. Of the *Puncture of the Bladder in a Suppression of Urine*; MARINUS, MEYERUS.

XXV. Of the *Art of Midwifry*; among the Ancients, RUPEUS, RUEF, RHODIO, PARÆUS. Among the Moderns; SCIPIO MERCURIUS, MAURICEAU, PEU, PORTAL, VIARDEL, VOELTERUS, SIGISMUNDA, a Midwife of *Brandenburg*; DEVENTER, DIONIS, MELLIUS, ST. AMAND, DE LA MOTTE, HOORN, SUECUS, WIDEMANNIA. Of the *Method of extracting a dead child*; HIPPOCRATES, SOLINGEN, FONTANUS, and the Authors we have just recited. Of the *bearing down of the Womb*; BECKIUS.

XXVI. Of *Clysters*; LANZONUS, SWARTZIUS. Of the *Fistula of the Anus*; MARCHETTUS, LE MONNIER, GLADBACCIUS, BASSIUS.

XXVII. Of the *Paronychia*; GLANDORPIUS, WEDELIUS, ALBINUS. Of the *Suture of the Tendons*; KISNERUS. Of *Clefts in the Feet*; WEDELIUS. Of *Ingraffing*; TALIACOTIUS, SALTZMANNUS.

C

XXVIII. Of

On Bandages.

XXVIII. Of *Bandages*; GALEN, translated by VIDO VIDIVS, with Figures; PARÆUS, in his *Surgery*, Part III. VERDUC on *Bandages* in *French*, and SOLINGEN; but the best Writers of all are LE CLERC, in his *Appareil Commode*, and BASSIUS in *High Dutch*, and ULHORNIVS. Of *Chirurgical Instruments* you may consult ORIBASIUS, PARÆUS, and SCULTETUS.

Writers of Observations.

XXIX. Of *Observations in Surgery*; the best are related by PARÆUS, HILDANUS, SCULTETUS, MARCHETTUS, TULPIUS, MECKEREN, ROONHUSIUS, LAMBSWERDIUS, RUYSCHIUS, BELLOSTIUS, PURMANNUS, SAVIARDUS, DE LA MOTTE, CHABERT, LE DRAN.

Miscellaneous Writers.

XXX. Of the *Principal Controversies in Surgery*, consult FIENUS. On the *Duties of a Surgeon in the Army*, read FRANC. DE ROMA, MURALTUS, SCHMID, TASSIN, PURMANNUS, BELLOSTIUS, ABEILLE. Of *Surgery in the Time of a Plague*; PURMANNUS. Of *Chirurgical Anatomy*; GERGA, CHESELDEN, PALFINUS. Of *Medicines used in Surgery*; HOLLERIUS, PIGRÆUS, WURTZIUS, HILDANUS, in his *Tract de Gistâ Militari*, ETTMULLER de *Chirurgiâ Medicâ*, LE CLERC, VERDUC DE FASCHIS, and BELLIOS in *Pharmacîâ Chirurgicâ*. *Chirurgical Instruments* are best described by ALBUCASIS, ANDR. A CRUCE, HILDANUS, GUILLEMEAU, FABR. AB AQUAPENDENTE, PARÆUS, SCULTETUS, SOLINGEN, MASSIERUS, DIONIS, HEISTER, and GARENGEOT.

Knowledge of Languages necessary to a Surgeon.

XXXI. Since many of the most valuable Treatises in Surgery have been published in the Learned as well as in the Modern Languages, it will easily appear of what great Service it will be to the Surgeon, to be well versed in those Languages, especially the *Latin* and *French*, since without this Assistance they will reap very little advantage from the Inventions of others: but whoever is moderately versed in the *Latin* Tongue, I would advise him to procure the Academical Theses upon Chirurgical Subjects which are yearly published, for the Experience is trifling, and the Advantage that accrues from reading them, is by no means so; for they frequently contain many new and useful Observations, Descriptions of Instruments and Machines, and new Methods of Cure, that are not to be met with in larger Volumes.

Division of Surgery into its Parts.

XXXII. Hitherto we have treated of the Nature and End of *Surgery*, described the Aids that are necessary to it, and related the Fortunes it has met with in different Ages; Order therefore now requires us to proceed to its Division, which is very different according to different Authors. There are many Professors of *Surgery* who divide this Art into six parts, and distinguish each of them with a *Greek* Name. These are, 1. *Synthesus*. 2. *Diæresus*. 3. *Exaresis*. 4. *Aphæresis*. 5. *Prosthesis*, and, 6. *Diorthosis*. On the other hand, some divide it into five, some into four, some into three parts, whilst others assert that it may be comprehended under two of these Divisions. But since Persons ignorant of the *Greek* Language are easily puzzled with *Greek* Terms, and besides that the Distinctions are not just, as not comprehending all parts of *Surgery*, it seems to be high time to abolish them, as we live in an Age, more inquisitive after things than words: more especially as these Terms would perplex the Memory of young Students in Surgery, who for the most are unacquainted with the *Greek* Language. Some, lastly, have been fond of dividing Surgery into five parts, the first treating of Wounds, the second of Ulcers, the third of Fractures, the fourth of Luxations, the fifth of Tumors. Though even this Method

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II

Method of dividing by no means satisfies me, since the whole Art cannot be clearly explained, by speaking to each of these Heads.

XXXIII. Wherefore in my Judgment, it is best to divide *Surgery* into the three following Parts, by which means the whole Art may be laid down and taught with Clearness. The first, which is called *Pentateuch* by FABRICIUS AB

The Author's Division of Surgery.

AQUAPENDENTE, from the number of Chapters it is comprised in, treats of the Disorders that are most common to the Human Body, and takes up five Books.

1. *Of Wounds.* 2. *Fractures.* 3. *Luxations.* 4. *Tumors,* and, 5. *Ulcers.* The second Part treats of *Chirurgical Operations*, (as they are commonly called) describing at the same time all such Disorders of the Human Body as are to be relieved by the Assistance of the Hand, and could not properly be described in the first Part. Lastly, *Chirurgical Bandages* will be the subject of the third Part, which we shall describe in so clear a manner, that it will be very easy to learn not only how each of them is to be made, according to the Nature of the Disease or of the Limb, but also how they are to be applied, to the Benefit of the Patient; for though we find that *Surgeons* have paid very little regard to the Descriptions of Bandages in their Writings, it is nevertheless not only extremely useful, but absolutely necessary. Sometimes Accidents happen of such a Nature, as *Luxations*, *Fractures*, *Hæmorrhages*, *Herniæ*, as only to admit of Help by Bandages, and where without such Assistance the Cure would be extremely doubtful or desperate; besides this, by a neat and dextrous Application of a proper Bandage, the Surgeon not only gains the Admiration of the Standers by, but his Patient also puts more Confidence in him, which very often forwards the Cure wonderfully.

XXXIV. Lest any one should be ignorant of the Method which I intend to observe in expounding the Chirurgical Doctrines which I am going to lay down, I shall give a brief Description of it in this place. That those who are desirous of acquiring a thorough Knowledge of *Surgery* may not be disappointed, I shall not, according to the Custom of many others, content myself with solely describing the Instruments and Machines that are made use of by Surgeons to relieve suffering Nature, neglecting at the same time the History of Diseases, and the Regulations that are to be observed with regard to Diet and Medicine, as if they were not things necessary for the Surgeon to be acquainted with; but, on the contrary, I shall use the utmost Diligence to explain, as clearly as it is possible, 1. The proper Nature and Disposition of the Disorder. 2. What Parts of the Body are liable to be affected by this or that Disorder. 3. What the peculiar Symptoms of each Disorder are, and how to form a proper Prognostic by them. 4. I shall describe the principal Chirurgical Instruments which are best adapted to each Case, of which you will find Copper Plates, for the most part of the same size with the Instruments which they represent. 5. I shall not only shew the best Method of performing all Operations in Surgery; but, 6. in what manner the Patient is to be treated after the Operation, so as to recover his Health in the most speedy, safe, and pleasant manner; and this not only with regard to the Dressing and Bandages which are to be applied to the Part, but also with respect to the Medicines which are proper to be administered, and the Rules which are to be observed as to his Diet.

The Author describes the Method that he intends to follow in Writing.

The Know-
ledge of In-
struments is
recommend-
ed, and a
Supply of
them pro-
mised.

XXXV. We declared above that a Surgeon's Hands would be of little Service to him, if he was not supplied with Variety of Instruments, which he ought to be very well instructed in, that ever hopes to arrive at a proper use of them in the Cure of Diseases. Therefore that we may the more readily form our Surgeon, it will be well worth our while to treat briefly of the necessary Apparatus of Instruments which he is to be furnished with, before we are solicitous about teaching him the manner in which they are to be used. I cannot deny but that there are a great number of Chirurgical Instruments to be found in Chirurgical Authors; but, at the same time, I can with truth affirm, that many of them are obsolete and useless, and many of excellent use have been omitted, (especially at the Time when I first published my Book of Surgery in the *German* Language in the Year 1718.) therefore it seems necessary to publish a Description, not only of the most modern Chirurgical Instruments, but of those best adapted to use, keeping up to their proper size as much as possible in the Plates. Whether our Plates have satisfied this end or not, let others judge: this I am certain of, that I have made it my study to save Students in Surgery the Labour of having recourse to many Volumes to search after proper Instruments, and to exhibit to their View all the best and most general Instruments in one Book; and in some places they will find Copies of Instruments which are not to be found in other Authors. GARENGEOT published a Book in *French* on Chirurgical Instruments, in which he exhibited many new and correct ones, but delineated in too small a size, which easily led Surgeons and Workmen, who endeavoured to imitate them, into Errors; the chief of these I have copied into this Book, and, wherever my Page would admit of it, I have given you the true Dimensions of the Instruments, in order to render them more useful. But as it is of much more service to examine the Instruments themselves than the Plates of them, therefore a Surgeon ought to neglect no Opportunities of examining and contemplating upon the best he can lay his hands on, and especially the newest invented. For my own part, when I read Chirurgical Lectures, I always shew my Pupils all kinds of Instruments that are used in Surgery, and point out the Defects of the Ancients, and the Improvements of the Moderns.

Pocket In-
struments
described.

XXXVI. But in the first place, as they are more immediately necessary, and are in constant use, I shall describe the Instruments in their true Dimensions, which a Surgeon ought always to carry about him in a proper Case, and are therefore called *Pocket Instruments*. To this place belong those Instruments in particular, which are described in Plate I, under the Letters A and B; *two Lancets* of different sizes. These are used, especially the smaller sort, in opening Veins, for which reason the *Greeks* called them *Phlebotoma*; but the larger sort are used to open Abscesses with, and are therefore called by the *French* *Lancettes à l'Abces*. The Letter C shews a pair of *strait Scissors*, fit for many uses; the Surgeon should have several pair of these at home, of different sizes, as they are necessary in different Disorders. D, a pair of *crooked Scissors*, proper to be used in dividing *Fistulae*, and in many other cases. E, a pair of *Forceps* furnished with Teeth at one End; these are used to remove Dressings, and sometimes to extract Splinters or Thorns; they are also serviceable to the Surgeon in his Anatomical Exercises. *Forceps* of this kind are commonly made of Steel, but those of Silver are much neater. F, a *Razor*; G, a *strait Incision Knife*,

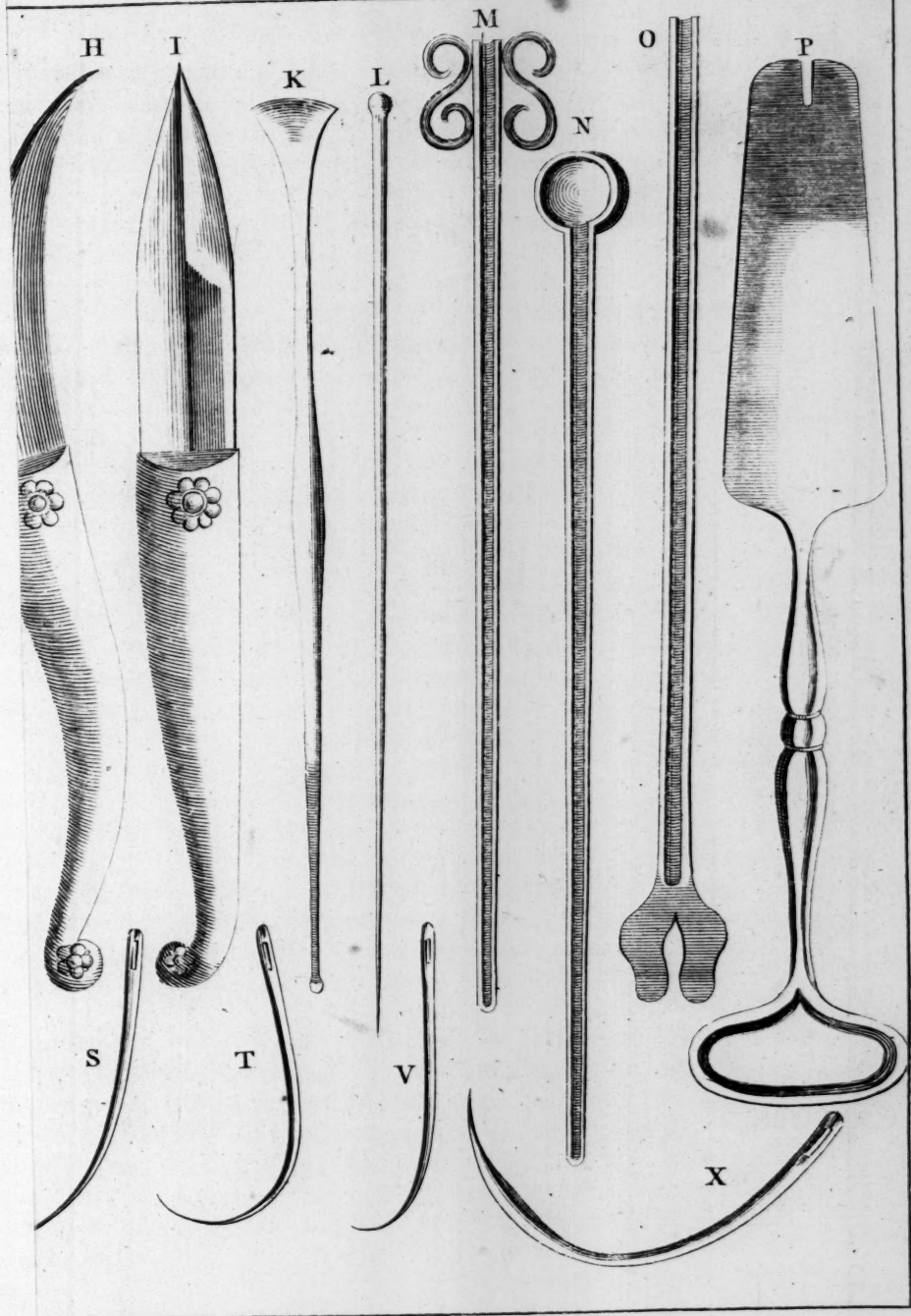
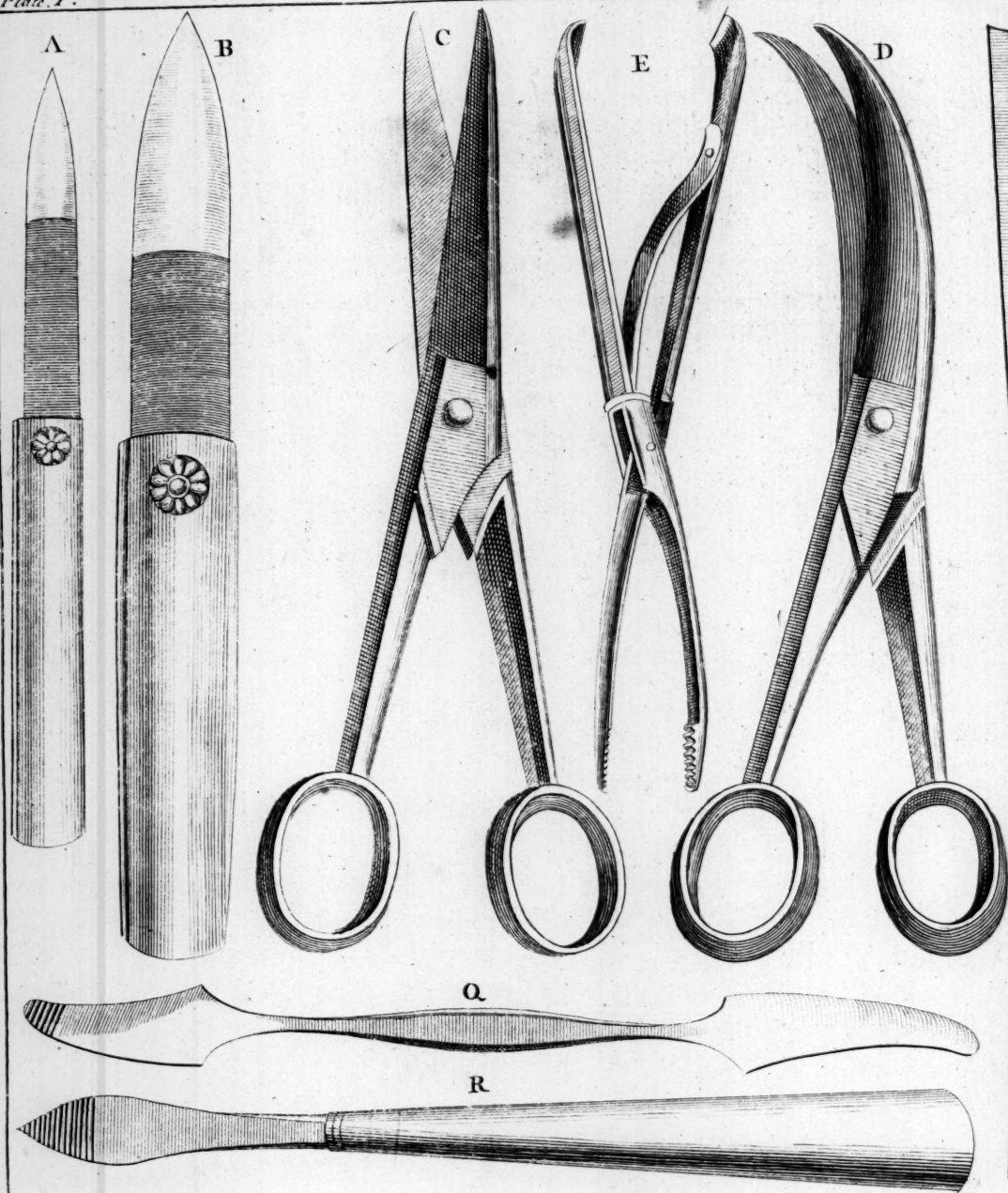
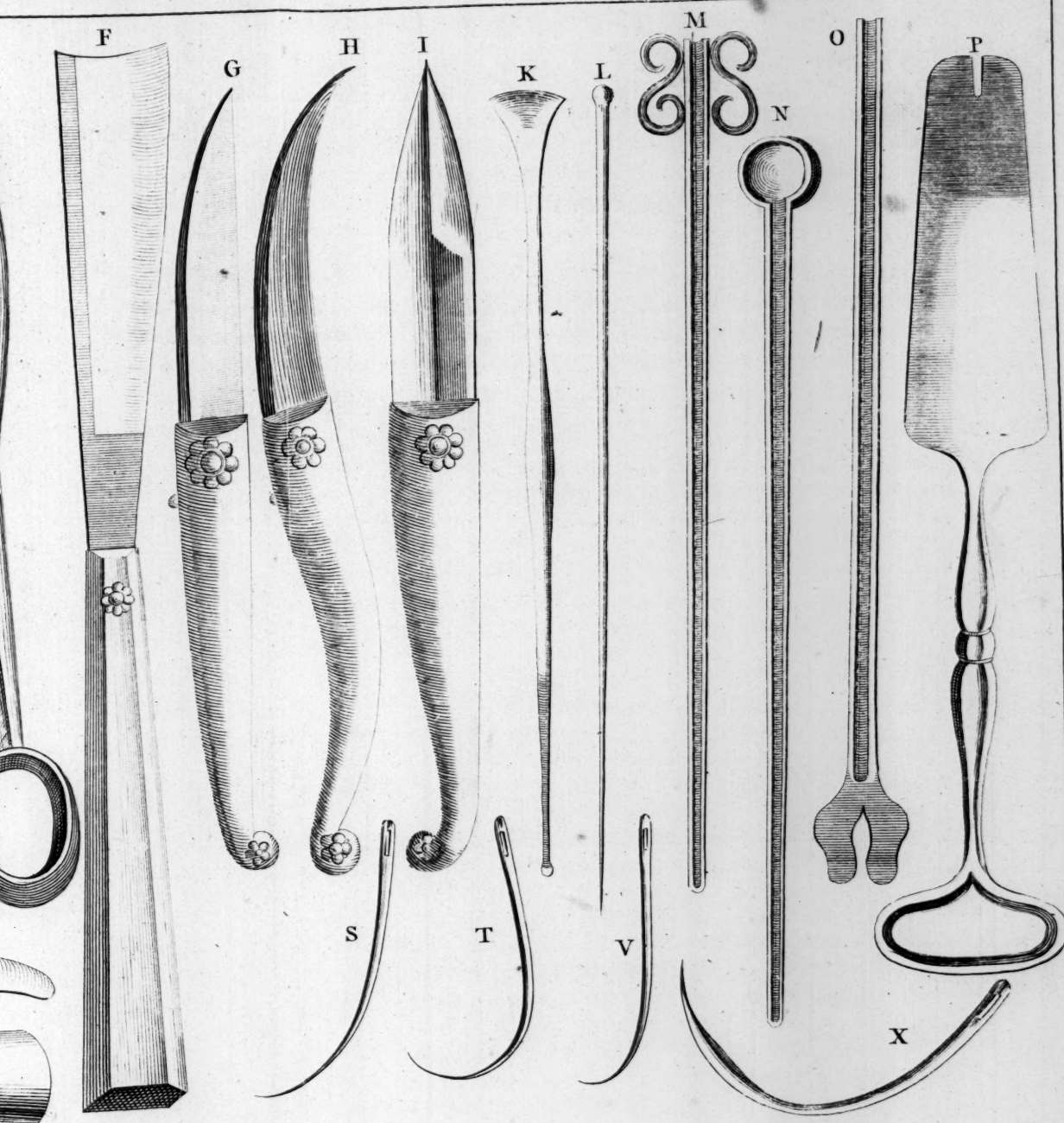
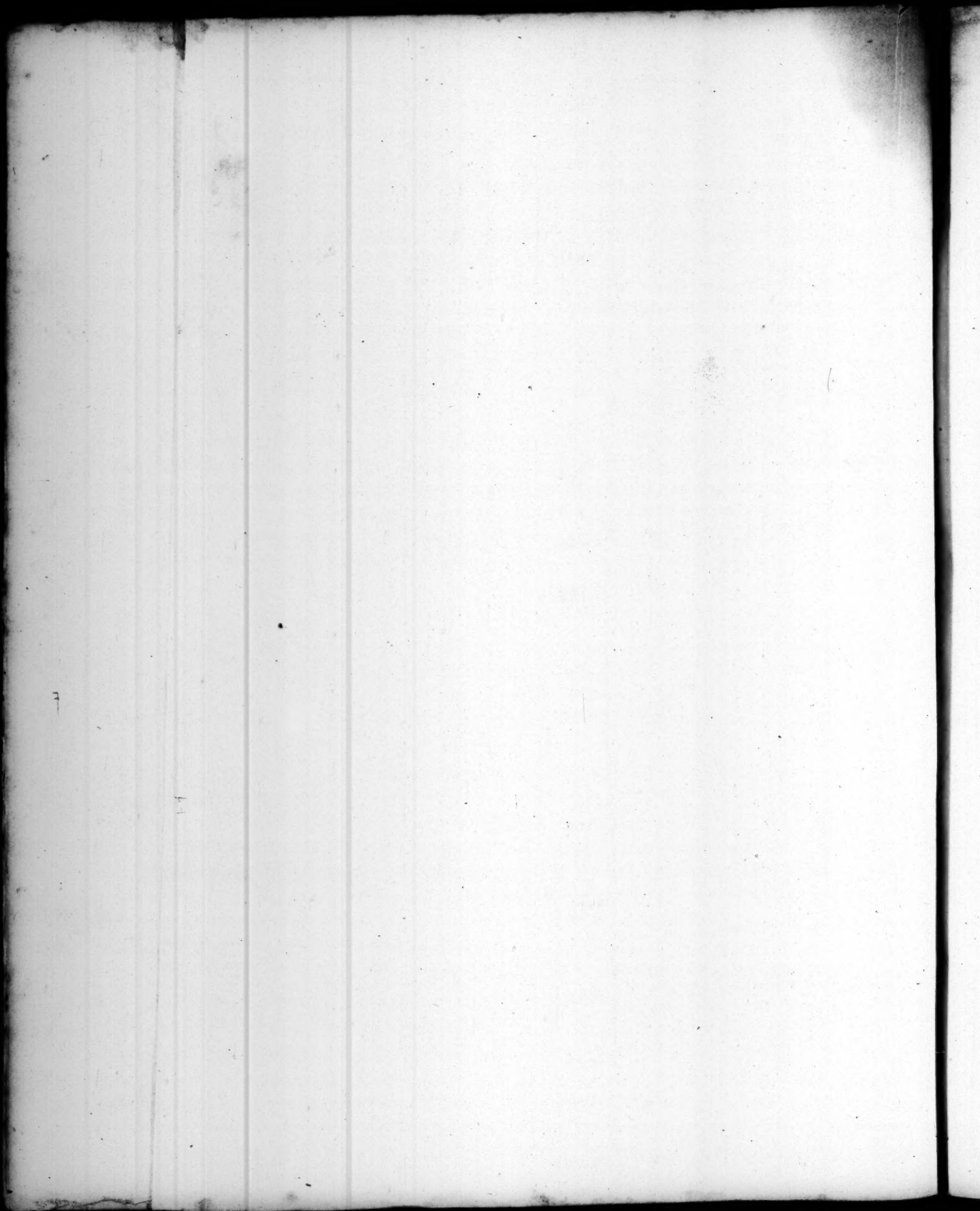


Plate I.







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Knife, by the *French* called *Bistouri*; H, a *crooked Incision Knife*; I, a *streight double-edged Incision Knife*; K, a *Probe*, which the *French* call *Une Sonde*; one End of which is broad and thin, for discovering a *Fissure* in the *Cranium*, and other uses; the other End is rounded with a *Nob*, to examine the *Depth* and *Situation* of *Wounds* and *Ulcers*: for which uses also the *Probe* at *Letter L* may serve. The neatest *Probes* are made of *Silver*, though they are frequently also made of *Steel*, *Ivory*, or *Whalebone*, M, represents a *grooved Probe* or *Director*, to direct the *Edge* of the *Knife* or *Scissors* in opening *Sinus's* or *Fistulae*, that by this means the *subjacent Vessels*, *Nerves* and *Tendons* may remain unhurt; the *Ornament* at the upper part of it is for a *Handle*, though sometimes that End is made in the *Form* of a *Spoon*, as you may see in the *Figure* at N, to contain a *Powder* to sprinkle upon *Wounds* or *Ulcers*; sometimes also it is forked at the End to divide the *Frænum* of the *Tongue*, as at the *Letter O*. Nor must we here omit the *Spathula*, as described at the *Letter P*. The use of this *Instrument* is to depress the *Tongue*, in order to examine the state of the *Tonsils*, *Uvula*, and *Fauces*, when they are affected with any Disorders; it is also used to suspend the *Tongue*, when the *Frænum* is to be divided; for which purpose it has a *Fissure* at its extremity, and should therefore be rather made of *Silver* than of any other *Metal*. The following *Spathulae* also at Q and R, somewhat resemble this: These are chiefly used in spreading *Plasters*, *Ointments* and *Cataplasms*, sometimes with their *fulcated Extremity* they are of Service in raising up fractured *Bones* of the *Cranium*. Here likewise, in the last Place, we must remember different sorts of *Needles*, *straight* and *crooked*, for stitching up of *Wounds*, taking up of *Arteries*, and many other uses: I have given you crooked ones of different *Sizes* at the *Letters S, T, V, X*.

XXXVII. What I have said concerning the *Instruments* that are immediately necessary for a *Surgeon* to be provided with, is sufficient; I shall proceed now to describe other things, with which he is equally obliged to be furnished, as certain *Medicines*; such as *Unguentum Digestivum commune*, *Unguentum Ægyptiacum*, aut *Fuscum Wurtzii*; for cleansing or digesting foul *Ulcers*: and some *vulnery Balsam*, as the *Linimentum Arcei*, *Balsamum Samaritanum*, *Peruvianum*, *Capyvæ*, de *Mechâ*, *Unguentum Basilicum*, *Oleum Terebinth.* or *Balsamum Sulph. Terebinthinatum*, &c. To these must be added a *Plaster* or two, as *Emplastrum Diapalma*, or *Stypticum Crollii*, since they will almost always be required. Neither should a *Surgeon* ever be unfurnished with a Piece of *Vitriolum Romanum*, to take down luxuriant *Flesh*, and stop *Hæmorrhages*; but if you are without *Vitriol*, its corrosive Intention will be answered by *Alumen ustum*, *Mercurius præcipitatus ruber*, or *Lapis infernalis*, or any other corrosive *Medicine*, which will also serve to make *Issues* or open *Abscesses*, or to perform any *Work* of that kind. But the *Surgeon* should always have in readiness a certain quantity of scrap'd *Lint*, that he may be able to give immediate Assistance to wounded Persons; since, if he is unprepared, they may be easily taken off with an *Hæmorrhage*, which circumstance ought also to prevail strongly with a *Surgeon*, never to be entirely unprovided with *Bandages*.

What Medicines a Surgeon ought to be furnished with.

XXXVIII.

Necessary
Qualifica-
tions for a
Surgeon.

Agility of
Body.
Resolution
of Mind.

Skill in
Physic and
Anatomy.

Frequent
Exercise in
Hospitals.

XXXVIII. We observed above (N. 2.) that it was the business of an able Surgeon readily to apply a Remedy to the Disorders of the human Body by manual Operations with the Assistance of Instruments. We have now described the principal Instruments as well as Medicines with which a Surgeon must of necessity be provided. It remains therefore to examine into the Qualifications he ought to be master of to render him accomplished in his Profession. The Agility of Body, and Resolution of Mind that are necessary to a Surgeon, are elegantly described by CELSUS: "A Surgeon (says he) ought to be in his full Vigour, to have a strong, steady Hand, never given to tremble, and to be as ready with his Left-hand as his Right; to have a quick, clear Sight, an intrepid Mind, void of all Tenderneſs, so as not to be at all moved by the Outcries of his Patient; to use no more Haste than the Case requires; nor to cut less than is necessary; but he should act in all respects as if he was entirely unaffected by his Patient's Complaints." But at the same time, I would have him behave with such caution as not to proceed rashly or cruelly, and particularly avoid giving unnecessary Pain.

XXXIX. The two Qualifications that I have just recited, are by no means sufficient of themselves to compleat the Surgeon; but there are others also which CELSUS has omitted, which are highly useful, and consequently necessary. No one will excel in Surgery, unless he is first furnished with a good natural Genius, to which he must join a well-grounded Knowledge in Anatomy and Medicine; if he is furnished with these gifts, he will not only with great Sagacity judge of the Causes and Circumstances of the Disorders upon which he is consulted, but will with great readiness make use of the best Methods, both with regard to the Administration of Medicines, and the Choice of proper Instruments for their Relief; or, if occasion require, invent new ones, and apply them with Success: whilst, on the contrary, they who are not Masters of these Qualifications, will daily be guilty of capital Errors.

XL. When these solid Foundations for Surgery are laid, and the Qualifications gained, which we have here recommended, our Student must by no means omit a proper Attendance upon the Lectures of Professors, and a due Diligence in reading Chirurgical Authors. Those therefore who desire a thorough Knowledge in Surgery, are not satisfied with visiting Cases that may accidentally occur to them in their private Practice, but diligently frequent all the Hospitals they can get Admittance to, and by this means they see more in one Year, than they could otherwise do perhaps in the whole course of their Lives. But in order to make the greater Proficiency in these Schools of Surgery, it will be worth while to distinguish the different kinds of Disorders that fall under your Inspection, after what Method, and with what Success they are treated by Masters of the greatest Experience. Being prepared by repeated Observations of this kind, assisted by the Advice of Masters, you may at length try your Hand, at first upon dead Bodies, and afterwards, when you have Opportunity, upon diseased Persons; for this trite Saying will always have its Force: *The Artist is not made by Reading, Meditating, or Disputing, but by Practice.*

* Vid. Lib. VII. Prefat.

XLI. Lastly,

XXI. Lastly, that the Surgeon may not appear disagreeable or terrible to his Patients, especially if they are Persons of Distinction or Quality, he should diligently avoid the appearance of Roughness in his Behaviour, or Nastiness in his Dress: For good Breeding and Cleanliness have their proper Effect in all Parts of Life; but the Surgeon gains a particular Confidence with his Patient by his Address, which has no small share in the Success of his Endeavours.

Good Manners and Cleanliness.

XLII. The Surgeon being endued with these Principles and Qualifications, may safely apply himself to the Practice of his Profession; but that he may succeed the better in the Execution of it, it is proper he should be acquainted with what is his Duty in every step of it. As soon as ever he is introduced to his Patient, he ought in the first place (as HIPPOCRATES well advises) to enquire of him, or his Friends or Domesticks, what ails him? where is the Seat of his Complaint? from what Cause it proceeds? and how long it has been upon him? If there is no particular Objection, he should examine the Part himself, and diligently weigh all that he has heard or seen that may give him any light into the Case, that he may come at a thorough Knowledge of the nature of the Disorder.

The Surgeon's Duties to his Patient.

First, he is to examine the Case.

XLIII. Having finished his Examination, the next thing to be done is to consider under what Class of Disorders it is to be ranked, and whether it be curable or not? If it is deemed curable, Whether it will be a Case of Time and Difficulty or not? whether it is curable by Medicines alone? or whether the Assistance of the Knife be necessary? for the safest and most gentle Methods, as CICERO with great Propriety observes, must always be preferred to harsh and dangerous ones, and are always to be tried first, that the patient may not suffer unnecessary Tortures, nor his Life be hazarded through the Rashness of the Surgeon; but to Disorders of a violent nature, dangerous and even doubtful Remedies are to be applied: agreeable to the saying of HIPPOCRATES, (*Aph. 6. Sect. 8.*) "Where Medicines fail, Instruments succeed." They are to be highly condemned, therefore, who, after the Methods of Mountebanks, condemn their Patient who labour under *Hernia*, without regard to Age or Habit of Body, to the Operation of the Knife, when far the greater part of them might be cured by a safer and easier Method. But if you shall find it impossible to save your Patient by gentle Methods, you should declare the Danger to the Patient, or rather to those about him, lest, if the Disorder should get the better of your Art, you should be suspected of Ignorance, or, perhaps, of Knavery.

Whether curable or not, and by what means?

XLIV. If the Surgeon shall find the Disorder to be curable, but to be of such a nature as to require the Knife, he should declare this in due time to the Patient, and should have his Approbation or Consent before he undertakes it; for a Surgeon is not only to take care to stop the Fury of the Disease, and allay present Pain, but also to provide against Accidents that arise from Delay; such as may aggravate and enhance the Distemper, and at last render the Case incurable. In very difficult Cases, where Danger consists not so much

He should undertake the Cure with great Circumspection.

* I saw an Instance of this in a Mountebank, who undertook the Cure of a Boy of about six Years of Age, for a *Hernia*, and not only performed the Operation, but castrated him: when I asked him in private, why he used this hazardous Method without trying a Truss, since his tender Age would easily have admitted of it, he ingenuously confessed he did it for Profit, for he would have been paid but a crown for the Truss, whereas the Operation brought him Ten, if not Twenty.

in

in Delay, as in the manner of Treatment, the Surgeon not only provides for his Patient's Good, but his own, if he calls in other skilful Practitioners as well in Physic as Surgery, with whom he may consult maturely and deliberately before he proceeds to any Operation; for by this means he will save himself from all blame of having proceeded rashly or ignorantly, especially when he is concerned for Persons of Distinction; if things should go otherwise than he could wish, he will avoid the Charge of having lost a Patient through his Indiscretion, whom perhaps no Art could have saved: Which very Reason should always induce a prudent Surgeon, in Cases attended with Difficulty and Danger, to desire the Assistance, if it can be procured, of the ablest and most experienced of his Fraternity.

He should be furnished with proper Instruments before he begins.

XLV. Having proceeded so far, with the Cautions that I have advised, every thing should now be carefully provided which is necessary for Incision, Dressing, or any other Action, before the Operation be entered upon; but this Apparatus of Instruments and Dressings should never be got ready in your Patient's Chamber, or in his Sight, lest they should strike him with a sudden Fear, and bring on fainting Fits and other Accidents, which would very much disturb the Operation. For the same Reason a Crowd of useless Spectators should never be admitted into the Room, because, besides the Disturbance that they create to the Patient, it is to be feared they will very much annoy the Operator, by intercepting the Light, and filling up the Room: Besides, should any one rudely press upon him, whilst he is performing any nice Operation, it might be of the utmost ill Consequence.

He should encourage his Patient.

XLVI. When the Surgeon is entering upon the Operation, he ought to use his utmost Endeavours to encourage the Patient, by promising him in the softest Terms to treat him tenderly, and to finish with the utmost Expedition; and indeed he should use Expedition but not Hurry, and should be very careful to give no unnecessary Pain, but at the same time to leave no Mischief unremedied; if he observes these Rules, he will be sure to gain Credit with the standers by.

After the Operation the Wound is to be dressed.

XII. The Operation being now over, the Surgeon is to consider what remains to be done towards supporting his Patient, and confirming the Cure; the Hæmorrhage occasioned by it is to be stopped, the Wound to be dressed, the wounded Part is to be placed in the most convenient and easy Situation; and it is now time not only to think of preventing any new Disorder falling upon the Part, but to use all Endeavours for restoring Health itself.

Proper Diet is to be advised.

XLVIII. It is his Duty now to prescribe a proper Regimen for his Patient's Diet, to provide him a commodious Apartment in a healthy Air, to encourage him to rest, and to avoid all Passions, and Reflections upon any things that may disturb his Mind; and if any fresh Incision, or other Operation, be necessary, he should be advised readily to submit to it. Every thing should be carefully avoided that may ruffle the Patient, for Disturbances of the Mind are great Enemies to the Health of the Body.

Impertinent Visits should be prevented.

XLIX. Frequent and impertinent Visits to the Sick, from his Friends or others, should be carefully prevented, for they will undoubtedly fatigue and disturb him; but we don't mean by this to cut him off from all Conversation with Mankind; a little cheerful Company now and then would rather give him Ease, and make him forget his Pains; but I had much rather he should divert himself by attending to others, than by speaking himself.

L. CELSUS

INTRODUCTION.

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L. CELSUS declared Physic to be a conjectural Art; these Conjectures therefore must be made with the utmost caution, and the Surgeon also should use the same caution in delivering his Prognostic, when he is called upon, and not, like bold Quacks, promise all will go well, whether the Case is curable or not. For should the Case turn out contrary to your Prognostic, you will either be accused of Knavery or Folly: So if we listen to Reason and ^a CELSUS, it is the Part of a Mountebank to aggrandize a small Performance: an honest Surgeon will always be very careful to avoid both Extremes; it is the Part of a prudent Man to declare from his Conscience what he takes to be the true State of his patient's Case; whether he believes it to be curable or incurable; what Hopes he entertains of his Recovery; and it is particularly incumbent on him to take the utmost care, that he encrease not a Disorder, which appears slight in the beginning, by treating it negligently. In doubtful Cases, where there is reason for great Fear, but not for certain Despair, he should declare his Reasons both for Hope and Fear; but where the Case is extremely dangerous, he should do it to the Relations. Sometimes it is better not to be concerned with a Patient, when it is impossible to be of any service to him, lest you should be said to have killed him, who died by his Disease ^b: But where you are concerned, let the Case be ever so desperate, it is always the Duty of a prudent Surgeon, to cherish the Patient with sweet Words, and give him Hopes of his Recovery; for some Disorders are very much aggravated by Fear, whereas the Expectation of Health and Ease is always so comfortable, that, though it will not cure a Disease, it will at least make it easier to be born.

Great Caution is to be used in prognosticating.

LI. We have already declared what are the principal Duties of a Surgeon; but since the *First*, which is strictly to examine the Case, and the *Sixth*, which concerns the dressing of the Wound, are more immediately necessary, we shall more largely explain what Methods are to be observed both in examining and dressing Wounds. In examining and discovering dangerous and difficult Disorders, the Surgeon requires many Assistances; at first his *Eyes* are necessary to him, by the use of which he will distinguish Wounds, Ulcers, Tumours, Fractures, Cataracts, and most Disorders of the Eye, and a thousand others; but if the Case is of such a Nature that it escapes the Sight, or is not wholly discoverable by it, the Hands are to be called in aid. This happens frequently in Fractures, Luxations, Abscesses, Herniæ, &c. *Instruments* also are sometimes required in this place, especially *Probes*, in discovering the Situation of Wounds, Ulcers, Fistulæ, Fractures of the Skull, Stone in the Bladder, and the like. The *Ears* also are required to give their report of some Disorders; Fractures of the Bones are frequently discovered by the noise which their Extremities make when they are rubbed together; the Sense of Hearing is of so eminent Service in discovering of Stones in the Bladder, that unless the Extremity of the Catheter is heard to strike against the Stone, we are never sufficiently justified in determining a Stone to be there. Some Disorders are discovered by the *Smell*. By the benefit of this Sense we discover the State of Malignity of an Ulcer; and in difficult Births, the *Fœtus* is discovered to be dead by the great Stench that proceeds from the Womb, and this is the only Method we have of being certain in this case. We are assisted also by this Sense in acquiring an

The Senses and proper Instruments of Service in examining Disorders.

^a Lib. V. Cap. 26.

^b Ibidem.

easier Knowledge of a Caries of the Bones, an ulcerated Cancer, and Disorders of this sort, which carry with them a peculiar Smell. If, therefore, the Surgeon has these Faculties in Perfection, Seeing, Feeling, Hearing, and Smelling; with the proper Exercise of these, and the Assistance of Instruments, he will seldom be at a loss in discovering the Disorder.

And Reason
itself.

LII. But Cases in Surgery sometimes happen, where the external Senses, assisted by Instruments, will by no means yield sufficient Light to their Discovery; but *Reason* and *Judgment* are also required: the true Nature of a Disease is traced by Reasoning upon its various Symptoms. HIPPOCRATES, the common Parent of Physic, seems to have regarded this, when he said^a, whatever escapes the Reach of our external Sight, should be searched for and overtaken by the Eyes of the Mind. So when any one has had a violent *Concussion of the Brain*, from a Fall or a Blow, without receiving any external Hurt, he will lay senseless, as if he were in a profound Sleep; Reason in this case will easily inform us, that there is an Extravasation of Blood in the Cavity of the Cranium, and that proper Methods must instantly be used to make a Passage for it externally. Our Reason is of equal Service to us in an *Empyema*; for tho' in this case Matter is formed in the Cavity of the Thorax, from a previous Inflammation of some of its Contents, yet we shall meet with great Difficulty in discovering this to be the case, by our external Senses; but by comparing the present Symptoms with the Disorder that was previous to them, we find it necessary to treat the Case as an *Empyema*; and of this kind there are many Instances.

Of the ne-
cessary Ap-
paratus for
Dressings.

LIII. We are next to treat of what principally belongs to the Method of dressing the disordered Parts. In this place we are first to speak of^b *Lint*, which is the Scrapings of fine Linen, by the *French* called *Charpie*. This may be made into various Forms, which acquire a different Name, according to the difference of their Figure; those that approach nearest to an oval or orbicular Form are called *Pledgits*, (by the *French*, *Plumaceau*) see Table II. Letters A and B. Lint made into a Cylindrical Form, or resembling the Shape of Dates or Olive Stones, is called a *Dossil* (in *French*, *Bourdonets*); their size is very different, as appears from the Figures at C D E. Sometimes they are secured by a Thread tied round their Middle, as it is expressed by the Figures at the Letters F G. It requires a good deal of Time and Experience, to acquire a proper Expertness in making up these Forms.

Uses of scraped
Lint.

LIV. These different Forms of scraped Lint, especially the cylindrical, are required for many Purposes; for they are applied, 1st, *To stop Blood in fresh Wounds*, by filling them up with dry Lint before you apply the Bandage; but if you have not scraped Lint at hand, you may tear a fine piece of Linen into small Rags, and apply it in the same manner, and perhaps with a better Effect; but in very large Hæmorrhages they should first be dipt in some Styptic Liquor, Alcohol, or Oil of Turpentine; or sprinkled with a Styptic Powder; but of this we shall presently treat more largely. 2^{dly}, *To agglutinate and heal Wounds*, to which end scraped Lint is very serviceable; if it is spread with some digestive Ointment or Balsam, or dipt in some vulnerary Liquor, they also yield us great Assistance. They are often serviceable, 3^{dly}. *In drying up Wounds and Ulcers*, and forwarding the Formation of the Cicatrix. They are used

^a In Lib. de Arte.

^b CELSUS, Lib. V. Cap. 26. Num. 21.

also with Success, 4^{thly}, *In keeping the Lips of Wounds at a proper Distance*, that they may not hastily unite, before the Bottom is well digested and healed. 5^{thly}, and lastly, They are highly necessary *to preserve Wounds from the Injuries of the Air*. The small portions of Lint that are tied round with a Thread (see *Tab. II. Letter F and G*) are chiefly used in dressing Wounds and Ulcers that are of the deeper kind, and are always applied to the Bottom of such Wounds, the remaining Cavity being filled up with other Portions of Lint, not supplied with a Thread, and by this means we do not only provide for the immediate Removal of these Dressings, when we shall think it necessary, but at the same time prevent a Possibility of leaving any Part of them concealed in the Bottom of the Wound. In very large Wounds, and especially in Amputations of the larger Limbs, which Operations are frequently required in the Army and Navy, at times when Lint is very scarce, it will be sufficient to dress the bare Bone and Face of the Wound with scraped Lint, filling up the Cavity with *Tow*, covering all with a large *Compress*; Figures of which you will see at the *Letters H and I, Plate II*. The Surgeons in former Ages formed Compresses of Sponge, Feathers, Wool, or Cotton, Linen being a scarce Commodity with them; but Lint is far preferable to all these, and is at present universally used; excepting, that in Wounds of the Thorax or Abdomen, the use of a Sponge may sometimes be necessary to suck up the Blood spilt in those Cavities.

LV. Besides the different Forms of Lint that we have described, there remains another, which is sometimes used in dressing of Wounds, called *Tents*, Of Tents composed of Lint. made of Lint worked into the shape of a Nail, with a broad flat Head; they differ in Thickness and Length according to the Size of the Wound for which they are intended, as appears by the Figures in *Plate II, at the Letters KLMN*. These Tents are chiefly used in deep Wounds and Ulcers. They are of Service, 1. Not only in conveying Medicines to the inmost Recesses and Sinuses of the Wound; but, 2. To prevent the Lips of the Wound from uniting before it is healed from the Bottom; to which we may add, 3. That by their Assistance grumous Blood, Sordes, &c. are readily evacuated. They are to be made extremely soft, that the Cure of the Wound may not be retarded by the Pain they would otherwise bring on: but that the Wound may not be kept too long, I would advise the Surgeon, as soon as he has cleansed the Part sufficiently, and finds the Sinuses heal up, to lessen the size of his Tents by degrees, and, as soon as he can conveniently, entirely to lay them aside. I am not at all surprized, that many Surgeons of good name, (amongst which are CÆSAR MAGATUS, BELLOSTE, and others) have entirely forbid the use of Tents; since to be sure it proceeded from a total neglect of this caution in their use, amongst too many of their Brethren.

LVI. But there is another kind of Tents, differing from that which we just now described, made of Linen Rags, not scraped, worked up into a Conical Form, to the Basis of which is fastened a strong Thread; the Apex of it must be a little unravelled to make it softer, that it may not become painful. The Thread is fastened to the Basis that it may be recovered with the greater Ease, if by any Accident it should be forced into the Cavity of the Thorax or Abdomen (See *Plate II, Fig. O.*); for it is to be observed here, that the Tents we now describe, are chiefly used to keep open Wounds that penetrate into the

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Cavity of the Thorax or Abdomen, in order to make way for the proper Discharge of Blood, Matter, &c.

Of Spongy
Tents.

LVII. A third sort of Tents remains to be described, whose principal Office is, not only to keep open, but to enlarge by degrees the Mouth of any Wound or Ulcer, which shall be thought too strait, that by this Means a freer Passage may be procured for the Blood and Matter that was confined, and that proper Medicines may find a more ready Admittance. These Tents are made either of *Sponge*, prepared in a certain Manner, or of dried *Roots of Gentian, Calamus Aromaticus, &c.* for these kind of things imbibe the Matter that flows to them, and being presently enlarged, dilate the Lips of the Wound. Not much unlike Tents, are the small *Silver* or *Lead*en Tubes, which are frequently used to draw off Blood, Matter, or Water from Wounds or Ulcers of the smallest Orifices; sometimes in extracting Water from dropfical Patients, or evacuating the Urine in a puncture of the Bladder: They are made of all Sizes and Shapes, as you may see in *Plate II, at the Letters P Q R S T V X.* What farther concerns the Use of these Tubes, you will see more largely treated of, when we shall describe the Disorders that more immediately call for their Assistance.

Of Plasters.

LVIII. Your Apparatus for Dressings will be very deficient if you are not furnished with *Plasters.* The meaning of the Term is so well known, that I should appear ridiculous if I went about to explain it. But there are different Kinds of Plasters without number; the principal of these, and the manner of making them, may be learnt from various Books, as particularly, the *Augustan Dispensatory*, the *London*, the *Prussian*, and that of *Lemery.* These Plasters are spread upon Linen or Leather, according to the different Circumstances of the Wound, Place, or Patient. If the Part upon which the Plaster is to be laid is naturally hairy, it must be shaved; that it may stick the closer, and be removed without pain to the Patient: But for the better Application to different Parts of the Body, the natural Shape of the Part must be consulted, and the Plaster formed accordingly: Therefore some Plasters assume a Round, Square, triangular, Elliptical, or Lunar Form; others the Shape of the Letter T, &c. as will clearly appear at *Plate II, Numb. 1, 2, 3, 4, 5, 6, 7, 8.* Others there are which are divided at one or both Ends, *See Numb. 9, and 10.* To these we may add those kind of Plasters which are perforated near the Middle, some with a single, some a double Perforation, which are of frequent Use in Fractures attended with a Wound; for by this Contrivance the Wound may be cleansed and dressed without removing the Plaster, *See Number 11.* Such Plasters are used too, especially those with the single Perforation, in making Issues or removing Warts and other Excrescencies, by corrosive Medicines.

The Size
and Use of
Plasters.

LIX. The *Size*, as well as *Form* of Plasters, is very various, since it must always correspond with the Part which is bruised or wounded. Their *Use* also is of great Advantage in defending Wounds and Ulcers from the external Air, or from any Filth which they might otherwise contract; for they are not only serviceable in securing the Dressings, but they also forward the Maturation of the *Pus*, agglutinate and heal Wounds, unite broken Bones, heal Burns, assuage Pain; and, lastly, strengthen the weaker Parts.

LX. It is frequently the Custom, after the Plaster and other Dressings are applied, to cover all with a *Compress*, which is made of the softest old Linen, Of Com-
presses. four, six, or eight times doubled, without Seam or Hem; these are of service, not only by preserving the Parts more safe from the Injuries of the external Air, but also for the better securing and fixing the Plasters and other Dressings. Compresses are also frequently applied, where no Plaster is made use of, and that, sometimes dry, sometimes wetted with certain Liquors, which are supposed to be strengthening, resolving, lenient, emollient, or cooling; they are frequently dipped in Decoctions of certain Herbs, into Wine, Spirit of Wine, Water, Vinegar, or Oxycrate, and sometimes into Lime Water; and these are either administered cold or hot, as the Circumstances of the Case shall require. The antient Physicians called them *Splenia*, from their Shape, frequently resembling the Spleen.

LXI. When you come to enquire after the *Figure and Size of Compresses*, you The Shape
and Size of
Compresses. will find as great variety as you did amongst Platters; many of them are *Square*, (See Plate II. N. 12.) others are *Oblong*, and not unlike the Spleen, N. 13.) again, others *Triangular*, (N. 14.) others resemble the Form of a *Cross*, (N. 15.) according to their Situation, some are called *Strait*, others *Oblique*, others *Transverse*, others *Annular*, as when they surround the Arm, or Foot. There are others again in the Form of an *Asterism*, (N. 16.) some are divided either on one or on both Sides, as far as the Middle, (N. 17, 18.) sometimes they form a *Hexagon*, (N. 19.) or are *Round*, or *Globular*, resembling a Ball; these are used in Luxations of the *Os Humeri*, and are placed under the *Axilla*, (N. 20.) sometimes Compresses of a much smaller Size are required, which are either *Square*, (N. 21.) and are used in Wounds of the Blood-vessels, to restrain Hæmorrhages, or *Taper*; (N. 22.) when they are called for in Sutures of Wounds, or in Ligatures of the Arteries. But all of them, of what Shape soever, should be something larger than the Plasters they are designed to cover.

LXII. Compresses of all Kinds are intended for these Purposes; 1. To pre- Use of Com-
presses. serve and cherish the natural Heat of the Body. 2. To secure the Dressings that lie under them. 3. To convey liquid Remedies to Parts wounded, or otherwise disordered, and to prolong the Use of them. 4. To fill up any Cavities or Depressions of the Parts, that the Dressings, (especially in Fractures) may be applied with greater Security. 5. To prevent Bandages from bringing on a troublesome Itching, or other Pain or Uneasiness upon the Skin. And lastly, 6. to stop Hæmorrhages.

LXIII. But it is now high Time to speak of *Bandages*, since they are so ne- Of Ban-
dages. cessary a Part of the *Apparatus* in dressing and binding up of Wounds. They are not only of greater Service than Compresses and Plasters in securing the other Dressings, but are also of excellent Use in restraining dangerous Hæmorrhages, and in joining fractured or dislocated Bones. Though I have set aside the third and last Part of this Work purely for the Description of Bandages, where you will find them more fully and accurately treated, I thought it nevertheless necessary to touch slightly upon these things that are principally necessary to a Surgeon, by way of Introduction.

LXIV. Almost all Bandages, that are used in Dressings of Wounds, Ulcers, Of what
Materials
they are to
be formed. fractured or dislocated Bones, should be made of clean Linen Cloth, softened by Wearing, but strong. They should be of a proper Length and Breadth; and, that it may be the stronger, examine the Course of the Threads, and tear the Cloth

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Cloth lengthways; Darns, Seams, and large Hems in the Linen should be avoided as much as possible, that no Inconvenience may be brought on by the Roughness and Irregularity of the Rowler. The proper Size of Bandages we shall describe more fully below.

Some Sorts
of Bandages
described.

LXV. There are different Sorts of *Bandages* for different Uses. Some are *common*, others *proper*; these are only applied to particular Parts, those may be applied to any Part. So we may distinguish them into *simple* and *compound*; the *simple* are those that are formed of one intire Piece of Linen, the *compound* of several Pieces of Linen sewed together in different Manners. The most simple of all is not rolled up, and is the Bandage used in Phlebotomy, See *Letter a*, *Plate II*. That at *Lett. b*, seems next to this, which is rolled up at one End, and is from thence called the *single-headed Bandage*, as those are called *double-headed* which are rolled up at both Ends, See *Plate II*, *Letter c*. Next to these come other Bandages which are made out of one Piece of Linen, but divided at both Ends almost as far as the Middle, See *Plate II*, *Lett. d*. These are called by the Surgeons *four-headed Bandages*. The Bandage at *Letter e* is somewhat shorter and narrower, and is divided at one End, and perforated at the other; this is generally used in Dressings that are applied to the Penis, or one of the Fingers. The *Letter f* describes a double-headed Bandage, divided about the Middle, which is called the *uniting Bandage*, from its Use, for it serves to unite Wounds that are made lengthways, without Suture. The *scapular Bandage*, which (as appears at *Letter g*) is provided in the Middle with an opening, through which the Head may easily be passed, the extreme Parts of the Bandage hanging one over the Breast, the other over the Back. The chief use of this Bandage consists in this, that in dressing Wounds of the *Thorax* or *Abdomen*, it is capable of supporting another Bandage that is somewhat wider, made of a Cloth four or six Times doubled, and bound round the Breast or Belly; as will appear more clearly from what you will read below.

Of the T
Bandage of
Heliodorus.

LXVI. There remains still to be described a compound Bandage, made of two Pieces of Cloth, almost in the form of the Letter T, as you see it described at *Lett.*; its upper Part is brought round the Belly and fastened by a Knot, but the lower Part passes under the Body between the Thighs, and being brought up again, is fastened to the upper Part upon the Back. These Bandages plainly appear to be designed for the Security of such Dressings as shall be thought proper to be applied to the *Anus*, or *Parts of Generation*. Some, from the Inventor, call it *Heliodorus's Bandage*; from its Shape it is called the *T Bandage*; and sometimes, from the Division that is frequently made in the lower part of it, it is called the *double T*.

The Explanation of the Second Plate, which exhibits those Things which are principally required in Dressings, taken chiefly from Dionis.

1. Of Pledgits, Tents and Compresses.

A and B, *Scraped Lint*, commonly called *Pledgits*, of an orbicular or oval Figure.

C D E, *Doffils*, which are composed of Lint, worked into the Likeness of Olives, or Dactyle Stones.

F and G, the same, with the Addition of a Thread tied round them.

H and I,

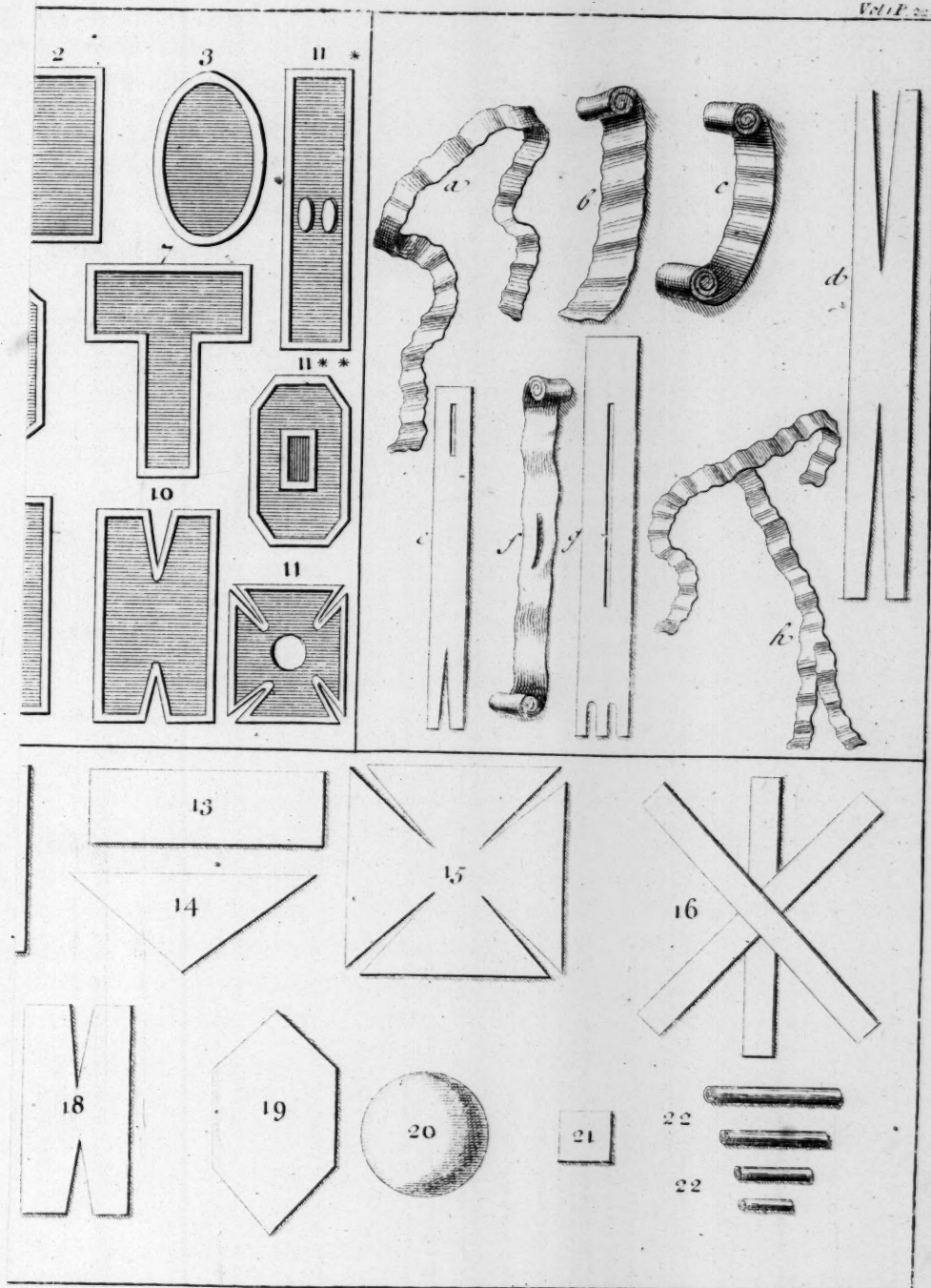
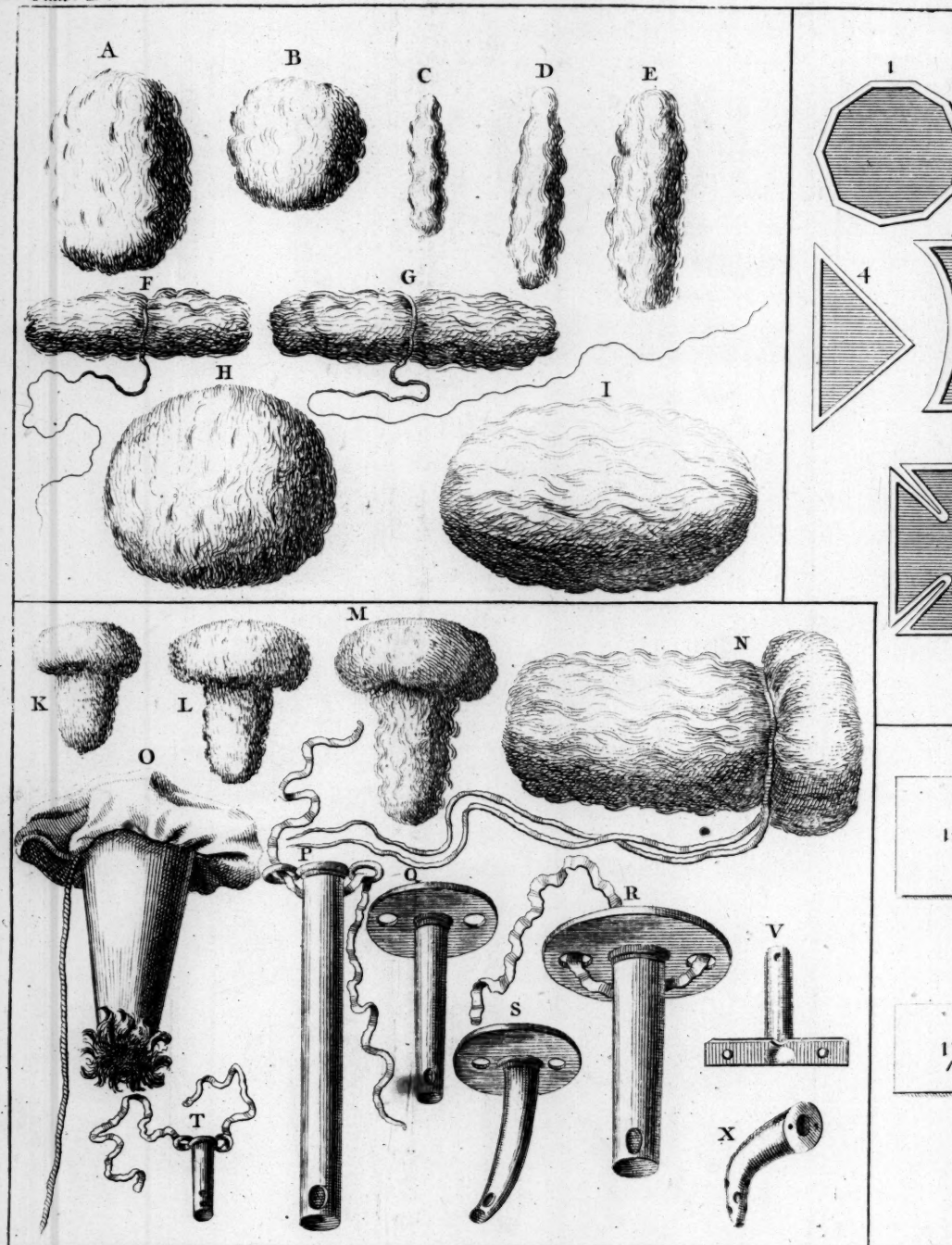
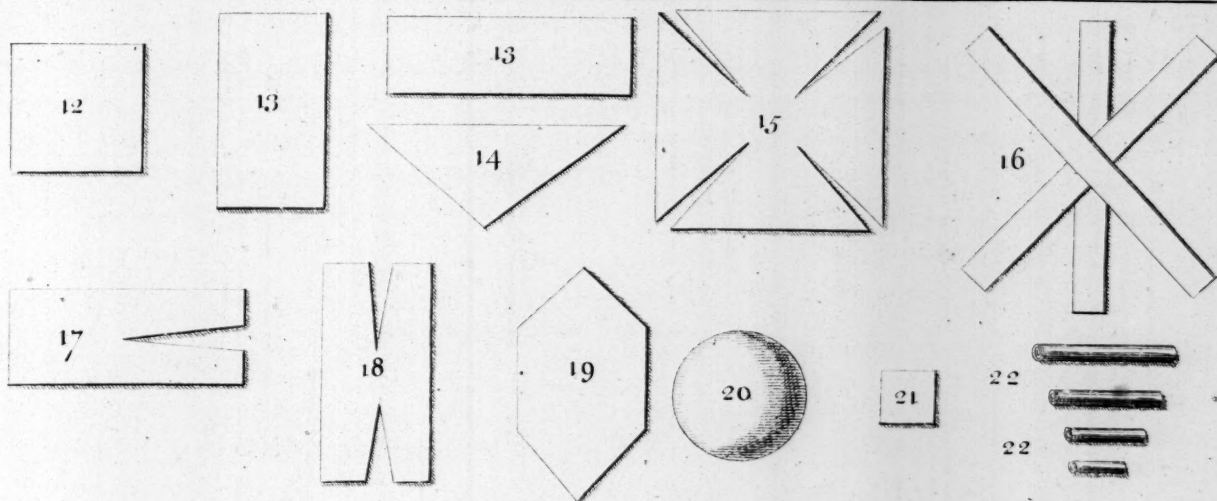
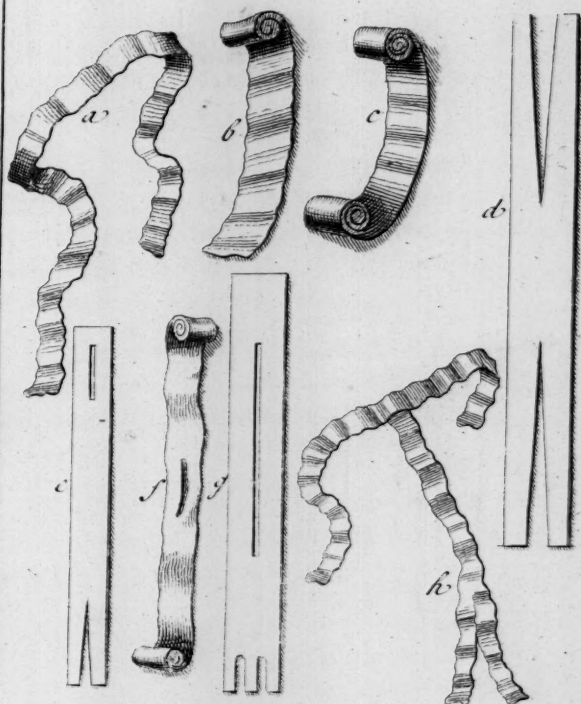
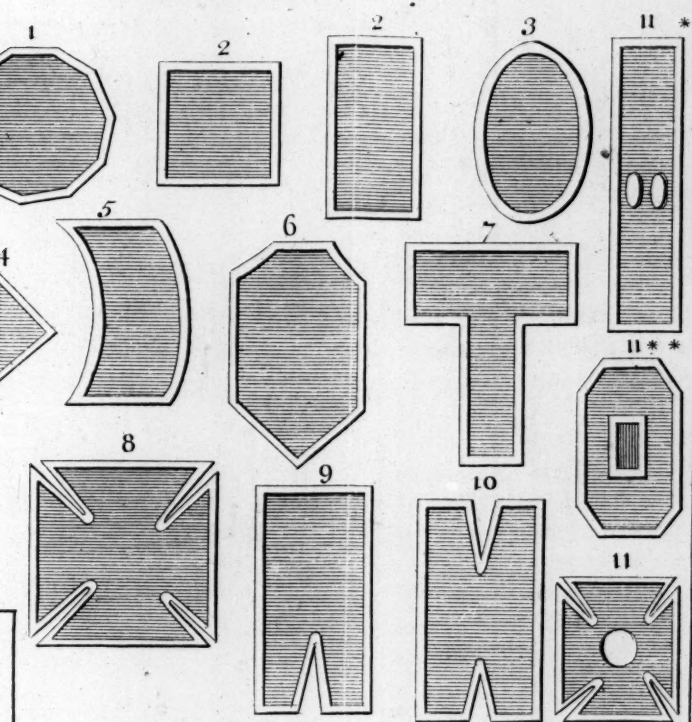
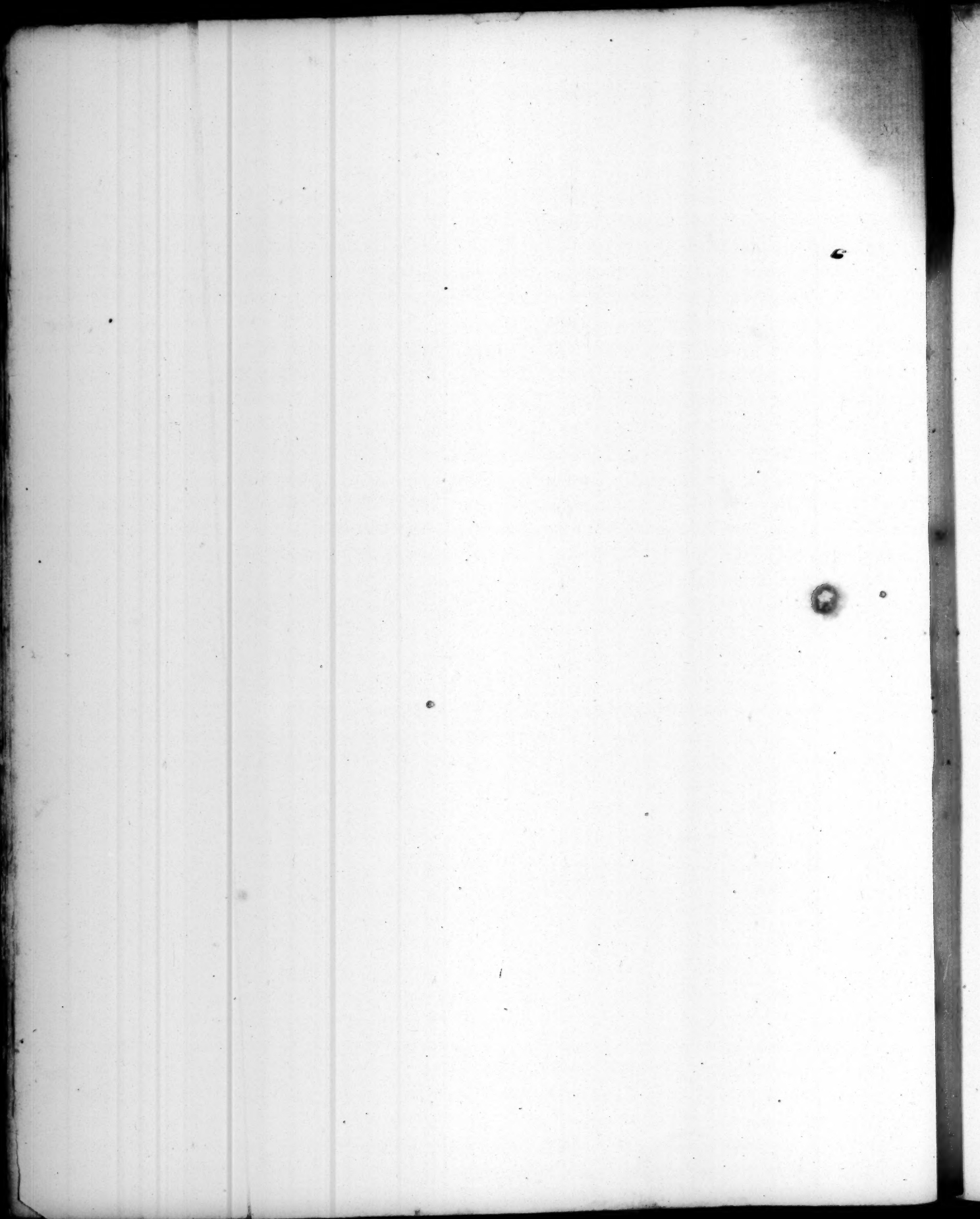


Plate 2.







H and I, *larger Pledgits* made of Tow.

K L M, represent *Tents* of different Sizes made of Lint.

N, shews you a very large *Tent*, with a Thread annexed to it.

O, a *Conical Tent*, still larger than the former, made also of Lint.

P Q R S T V X, *Tubes* of different Kinds made of Silver or Lead.

Number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. different Forms of *Plasters*.

Num. 12, 13, 14, 15, 16, 17, 18, 19. different Sorts of *Compresses*.

Num. 19. three Sorts of *Compresses*, resembling the Form of an Asterism.

Num. 20. Balls of Lint, which are sometimes used as *Compresses*.

Num. 21. A small square *Compress*.

Num. 22. Several small slender *Compresses*.

Of Bandages.

a, A simple *Bandage*, not rolled up.

b, A *Bandage* of one Head; that is, rolled up at one end.

c, A *double-headed Bandage*, rolled up at both ends.

d, A *four-headed Bandage*.

e, A small *Bandage*, particularly intended for the Security of Dressings that are applied to one of the Fingers, or the Penis.

f, The *uniting Bandage*, which is perforated in the Middle.

g, The *Scapular Bandage*.

h, *Heliodorus's*, or the T *Bandage*.

LXVII. Though Surgeons have formerly invented different Kinds of Bandages, for every Wound that could be inflicted upon the Head; yet there is but one Form that seems necessary, and that will answer every End that can be proposed from this kind of Application. This is made in the following Manner: Take a Handkerchief, Napkin, or any square Piece of Linen, double it up in a triangular Form, and apply it, as we frequently do in hot Weather, when we lay aside the usual Coverings of the Head, to moderate the excessive Heat of the Sun. The Bandage which is so much in Use amongst the modern Surgeons, called by the French, *Le grand courechef*, differs very little from this, and is commonly made of a Napkin, or some soft Piece of Linen, in a square Form. It is doubled in such a Manner, that the lower Part is about four Fingers Breadth wider than the upper; the middle Part of this Cloth is placed so upon the Head, that the fore Part may reach almost as far as the Eyes, the four Extremities or Corners of it hanging over the Cheeks. The two Corners of the upper or narrower Part are to be tied under the Chin, at the same Time the Corners of the lower or wider Part are to be brought towards the back Part of the Head, and tied together, or fastened with a Needle and Thread. The fore Part that was extended towards the Eyes, is turned back as far as the Crown of the Head; the two Parts that hang over the Neck almost to the Shoulders are also to be turned back, and fastened behind the Ears with a Needle and Thread. This kind of Bandage, when it is neatly made, sticks close to the Head, and is an excellent Contrivance to preserve it from the Injuries it might receive from cold Air; for which reason it is at present in great Use and Esteem. You may in some Measure form an Idea of the Appearance it makes upon the Head by consulting *Plate III, Fig. 1, Letter A.* But

The most
common
Bandage for
the Head.

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But the Method of applying it must be learnt from some skilful Artist; for it will easily appear, from this one Instance, how difficult it is to describe the Art of applying Bandages, by Words, and how impossible it is to learn it from such Descriptions.

Application
of the Scapu-
lar Bandage.

LXVIII. *Letter B, Plate III, Fig. 1*, describes a Bandage which is generally used to secure Compresses and other Dressings that are applied to the Breast or Belly. The manner of preparing this Bandage is described above at *Sett. 65*; therefore in this Place it remains only to shew the most convenient Method of applying it. After the Wound is dressed, take a double Cloth, and wrap it round the Abdomen or Thorax, sewing not only the Ends of the Cloth strongly together, but fastening it also in the same Manner to the Extremities of the Scapular Bandage, to prevent it from slipping down; the Manner in which it is done appears very plainly in *Plate III, Fig. 1, Lett. B and C*.

The Ban-
dage for
Phlebotomy.

LXIX. The *Letter D* shews the Bandage or Ligature that is used to Veins of the Arm; *E*, to those of the Foot; but we shall treat more largely of the Manner of preparing and applying them in the third Part of our Chirurgical Institutions.

Names of the
most simple
Windings of
the Bandage.

LXX. We have this farther to add, concerning simple Bandages; they assume different Names, according to the different Windings that they form in the Manner of applying them: For instance, if a simple Bandage with one Head surrounds an injured Part with one direct Course, it is called *annular, orbicular, or circular*. On the contrary, if the Windings of the Bandage ascend or descend equally in a spiral Manner, they are called *obtusè or spiral*; this frequently happens in Fractures, and other Kinds of Disorders, and is of very eminent Service. But when the Limbs which are to be bound in this Manner are of different Thicknesses in different Parts of them, which is the Case of the *Tibia*, it requires a good deal of Art to prevent the Windings of the Bandage from hanging loose. The Bandage is to be applied to the *Tarsus*, and to be brought upwards so as to cross the *Malleoli*, rolling it round the *Tibia* in a spiral Manner; but when you are come up to the Calves of the Legs, each round of the Roller must be turned in a particular Manner, and tightened according as the Case requires. It is much easier to communicate this Manner of turning in the Roller at each Round, than to describe it in Words. Consult in this Place *Plate III, Fig. 1, Lett. F*. But from what has been said, you will easily conceive the Reason why the Windings of the Bandages that we have been describing, are generally said to be inverted, and by the *French* are called *Renversees*. These Bandages are so managed that the Windings of the Roller are contiguous to each other; but there is another Method of rolling in Use, where the Windings of the Bandage are not so frequent, and keep a greater distance from each other, and are therefore called *creeping Bandages*, in the *French Schools Rempans*; an Example of which you may see in the left Arm of the last mentioned Figure, at *Letter G*. These creeping or serpentine Bandages are used to secure Compresses, Fomentations, or Cataplasms upon a diseased Part. Lastly, there are Bandages called by the Surgeons, *Containing, Uniting, Dividing, or Expelling*, from their several Uses and Intentions.

Where the
Bandage
ought to be-
gin and end.

LXXI. But lest any one should be ignorant of the neatest and most proper Way of applying these Bandages, you are diligently to observe what follows; to wit, when the Arm is to be dressed, the beginning is formed by two or three circular

circular Windings on the Wrist, ascending by loose Spires to the Cubit or Shoulder as the Case shall require ; but when the beginning is to be on the Foot, it is to be formed by three or four circular Windings of the Bandage round the *Tarsus* and *Metatarsus*, then proceeding in a serpentine Course up to the Knee, or, if the Case requires it, up to the Head of the Thigh, and then, as it sometimes happens, descending again. But we should not neglect to mention in this Place, that the beginning of the Bandage is sometimes applied even to the diseased Part, as in several Kinds of Fractures ; sometimes near it, above it ; or below it, and sometimes at a great distance from it, according to the Disposition of the Wound. On the contrary, the Extremity of the Bandage is scarce ever fastened upon the diseased Part, but rather upon a sound one, to avoid giving Pain^a. Upon the whole, we must inculcate this general Admonition ; that, whatever the Case be, whether Wound, Fracture, Luxation, or Amputation, your Bandage be neither too loose, nor too tight ; for loose Bandages do not confine the Parts enough : and, when they are too tight, they may cause not only violent Pains, but Inflammations, Tumors, Gangrene, and Mortification.

LXXII. The necessary Apparatus for Dressings seems by no means complete without *Ligatures*, *Chords*, *Bands*, and *Strings*, and these of different sorts, some fine, others coarse, strong, made either of Flax, or Hemp, or Cloth, or Silk, or Horse-hair, according to the nature of the Disorder ; for these things are almost constantly required. We use them to replace, or extend Bones that are broken or dislocated, to tie the Patients down, in Lithotomy, Amputations, and Operations of that kind ; to tie up the Veins in Phlebotomy, to tie up Arteries after Amputations, or in large Wounds ; to secure the Splints that are applied to Fractures ; to tie up the Processes of the Peritoneum with the Spermatic Vessels in Castration ; and lastly, in taking off Warts and other Excrescences by Ligature, and in all other Operations of this kind, as we shall more fully explain below.

Of Chords,
Bands, Li-
gatures and
Strings.

LXXIII. What we have already said concerning the Qualifications which every Surgeon ought to be indued with, and of the Instruments with which it is necessary for him to be furnished, is sufficient for this place, by way of Introduction to the following Work. We may evidently draw this conclusion from the foregoing Discourse, that Surgery is no easy Art, but affords a large Field for Enquiry, and is not to be attained without great Assiduity and Labour. The Surgeon has not only a vast number of Disorders to encounter, but the means by which every kind of Disorder is to be subdued are almost infinite, the particular nature of which must be known to the greatest Exactness. But I by no means discourage any one from these Studies by the Difficulties that I here speak of, for there is nothing, according to the old Proverb, but what is to be overcome by Industry. I would rather advise Students in Surgery to have the most famous of the Ancients in this Art always in their eye ; and to consider that we not only enjoy all the Advantages they had, but far greater ; for we have been so largely assisted by the Inventions of ingenious Men in these latter days, that if we equal our Ancestors in Industry, we shall easily exceed them in Skill.

The Study of
Surgery is
very difficult.

LXXIV. But altho' the Attainment of Surgery had been still more difficult than it is, yet as we do not enquire into the Difficulties, but the Honours and Uses that attend the Acquisition of an Art or Science, before we make choice of it ; this is so far from being a Discouragement to generous Minds, that it is rather an Incitement to their Industry. That Surgery is extremely necessary for

But never-
theless ex-
tremely ne-
cessary.

^a See CELSUS, Book V. Chap. 26. Number 24.

the Preservation of Life, does not only appear from what we have already laid down, but from the Necessity the Physicians frequently lye under of calling for the assistance of this Art, not only in external Disorders (to which some would impertinently confine Surgery) but in internal Complaints also, where Medicines, and a proper Diet, are in no wise equal to the Cure, as is the Cataract, Stone in the Bladder, Empyema, Dropsy, Suppression of Urine, difficult Births, and an infinite Number of other Cases; in which they are often obliged to fly to Surgery, as their sole Anchor; as appears from the Testimony of the great HIPPOCRATES^a. Amongst the great numbers that have been Scoffers and Deriders of Physic, there have been very few so hardy as to reject Surgery as an useless Art; for indeed he must be entirely given up to Impudence and Folly that would pretend this to be an useless Art, by whose Assistance the most grievous Disorders that the Body is subject to are relieved; to wit, Wounds, and the Loss of Blood that is consequent upon them, Fractures or Luxations of the Bones, Stones in the Bladder, Suppression of Urine, and an infinite Number of others.

Surgery the
most certain
part of Phy-
sic.

LXXV. I would have no one be surprized at the Assertion, that Surgery surpasses all other Branches of Physic in point of Certainty; what CELSUS said formerly upon this Occasion is very true^b, "The Effects of Surgery are more evident than those of any other Branch of Physic, since in many Diseases, (the internal especially) Nature or Accident may do much, and the same Medicines have sometimes a good Effect, and sometimes no Effect at all, so that it becomes Matter of Doubt, whether Health be the Effect of the Medicines that have been administered, or of a good natural Constitution of the Body; but in Disorders that are relieved by the Assistance of the Hand, it is very evident from whence the good Effect proceeds." Whatever good Effects we produce by stopping violent Hæmorrhages, by taking off Tumors and Excrescences, by curing Herniæ, by cutting for the Stone, by couching Cataracts, by drawing forth suppressed Urine, by changing the cross Position of the Infant in the Womb, and bringing it into the World, by setting broken Bones, and reducing luxated ones, and by relieving other Disorders of this Sort; for all this we are evidently obliged to the Hand of the skilful Surgeon.

Students in
Surgery in-
cited to In-
dustry.

LXXVI. Having premised this by way of Introduction, we cannot avoid again and again exciting all Students of this most noble Art to Diligence and Industry, and not to rest satisfied with being able to shave, spread a Plaster, or open a Vein; for I would have them know, that not only a good natural Sagacity, but great Labour and Study also, are absolutely required to qualify a Man for so great a Trust as that of taking care of the Health of Mankind. Students in Surgery should not only be furnished with Strength of Body, but Constancy of Mind also, that they may remain unmolested and unmoved by the Stench, Blood, Pus, and Nastiness that will naturally occur to them in their Practice. They should consider, that by frequent Exercise these Things will become customary to them, and they will acquire, as it were, a second Nature. And a Surgeon should submit to the greatest Inconveniencies, rather than neglect any thing that might be for the Benefit of his Patient; for then he will have performed his Duty properly, and have satisfied his own Conscience, when he has done every thing that comes within the Compass of his Art for the Service of his Patient.

^a Sect. 8. Aph. 6.

^b See Lib. VIII. Præfat. and HIPPOCRATES de Arte, V.

INSTITUTIONS OF SURGERY.

PART the FIRST.

Of the Five Kinds of Disorders of the Body.

BOOK the FIRST.

Of WOUNDS.

CHAP. I.

Of WOUNDS in general.

I. **W**E were persuaded by two Reasons to begin these Institutions of ^{A Wound,} Surgery, with an Enquiry into the Nature of Wounds; for ^{what.} Wounds are not only more common than any other external Injuries, but the Nature of them also is more easily explained in our Schools of Surgery. And indeed when we are thoroughly acquainted with the Nature of a Wound, we shall with much greater Ease and Clearness comprehend all the other Doctrines of Surgery. What a *Wound* is, the most unskilful are acquainted with; but it is frequently defined to be a *violent Solution of the Continuity of the soft external Parts of the Body, made by some Instruments, whether sharp or obtuse.* Others take a greater Latitude in defining it, and call every external Hurt of the Body, by what Cause soever produced, a *Wound*. For Instance, they reckon violent Strokes upon the Head, Thorax, or Abdomen, under the Title of Wounds, though no external Parts are divided, as will easily appear from what we shall say below, when we come to treat of mortal Wounds.

II. On the other hand, some are of Opinion, that unless the injured Parts of ^{Differences of Wounds in relation to the inflicting Instrument.} the Body are divided by some sharp Instrument, as by a Sword or Knife, it is by no means to be called a Wound; though it plainly appears, from what has been already said, that those Injuries which are produced by blunt Instruments, may properly enough be called Wounds; under this Head are Gun-shot Wounds, Wounds inflicted by Stones, Clubs, or that come by violent Falls: Therefore we may constitute two Differences of Wounds; the one made by *acute*, the other by *blunt Instruments*.

On what
Parts of
the Body
Wounds are
inflicted.

III. Wounds are generally inflicted upon the *softer Parts of the Human Body*, such as the Skin, Fat, Muscular Flesh, Ligaments, Blood-vessels, and Nerves, and Parts that are composed of these, as the Viscera and Intestines; but whilst we are asserting this, we must by no means entirely exclude the *more solid Parts of the Body, as the Bones*; since the Bones themselves afford frequent Examples of Injuries received from sharp Instruments. The Parts, therefore, that are subject to these Injuries will afford us two Distinctions of Wounds; one, *Wounds of the soft Parts*; the other, *Wounds of the Bones*.

Causes of
Wounds.

IV. As *Causes of Wounds*, all Instruments of what kind soever, whether blunt or sharp, may properly be reckoned, provided they are of such a Nature, that, upon the violent external Application of them, they are capable of producing a Solution of Continuity in the Parts of the Body upon which they are inflicted: For a Solution of the external Parts from an internal Cause is not called a Wound, but rather an *Abscess*, or *Ulcer*. So when the harder Parts of the Body, to wit, the Bones, are broken by a Fall, or by a violent Blow received from a blunt Instrument, we do not call that a Wound, but a *Fracture*.

Effects of
Wounds.

V. *The Effects which are produced by Wounds*, besides the Division of the softer Parts, are generally *Profusions of Blood*, though they are sometimes attended with much greater Mischiefs than these: For it can scarcely happen, but that the divided Parts must in some measure, if not totally, lose their natural Functions, according to the different Uses for which the Part is intended, and according to the different Degree of Injury that it receives. The greater Number of Uses a Part is intended for by Nature, the worse will be the Consequence of a Wound upon that Part. This Principle is so extensive, that we are always guided by it in forming our Prognostic, whether the Wound will prove mortal or not. He therefore that is best skilled in Anatomy, that is best instructed in the Situation of Parts, and their Uses, will be enabled to form the most accurate Judgment of the Consequences that will necessarily attend a Wound upon any particular Part.

Different
sorts of
Wounds.

What we have taught of the different Situations and Causes of Wounds, sufficiently demonstrates, that there are many different kinds of Wounds: some are brought on by *Puncture*, some by a *Stab*, and some again by a *Blow*: some are *curable*, others *incurable*: some are made with *sharp Instruments*, others with *blunt* ones: To which Class may be referred all Gun-shot Wounds, all that are occasioned by a Blow, or a Fall, and which the Surgeons distinguish by the Name of Contusions. With regard to their *Figure*, some form a *right Line*, others are *curve*, *transverse*, or *oblique*: with respect to their *Situation*, some are seated in the *Head*, others in the *Neck*, *Thorax*, or *Abdomen*; and of these, some are *external*, others *internal*. Variety of different kinds of Wounds arise from the great diversity of Condition that Wounds are left in: For in some Wounds the inflicting Instrument, or Part of it, remains; for instance, a Lead Bullet, a Piece of Glass, or of a Grenade, the Points of Swords or Arrows: But in some Wounds nothing of this kind is left. Sometimes *Fractures of the Bones* accompany Wounds, which we almost always find to be the Case in Wounds of the Head, and in Gun-shot Wounds. Some Wounds also are attended with Poison, as those which are made with poisoned Arrows, or other Instruments. Under this Head we may very properly rank the Bites of Animals, but more particularly of mad or venomous Animals. Some are of Opinion, that

that Wounds which are made with Copper or Silver Instruments should be reckoned in this Class, the Poison of which, if there is any, is owing to the Vitriol that is mixed with these Metals.

VII. In *slight Wounds*, that is to say, where no considerable Vein, Artery, Nerve or Tendon is concerned, you will usually remark the following *Appearances*: At first sight, the Wound appears to us as a red Line drawn upon the Part, but upon being dilated the Blood instantly gushes out, in greater or smaller Quantities, in Proportion to the Size and Number of the Blood-vessels that are injured. The Hæmorrhage, after a short Continuance, stops of its own accord, or by some external Application, and the Blood concreting in the Wound, forms a Crust: The Lips of the Wound now begin to look red, and swell, and are attended with some Degree of Pain and Inflammation. If it is a large Wound, a Fever, that is to say, an universal Heat and Quickness of Pulse almost always ensues. Upon the third or fourth Day, sooner or later, a whitish glutinous Humour, not unlike white Oil, appears; and this is known to the Surgeons by the Name of *Pus*, or *Matter*. Upon the Appearance of Matter, the Redness, Tumor, Pain, Inflammation, and Fever disappear entirely, or at least are sensibly abated; and these are the Signs of a Wound inclining to heal: For under the Matter we have described, new Flesh springs up from the wounded Vessels, which having by Degrees filled the Wounds, dries upon its upper Part, and forms a Cicatrix.

VIII. In *dangerous Wounds*, that is, where any considerable Blood-vessel is wounded or divided, there generally ensues so violent an *Hæmorrhage*, that the wounded Person is an instant sensible of great loss of Spirits, and Weakness, and faints away; and when the larger Arteries are wounded, whether they are internal or external, he dies upon the Spot. Although somewhat less Danger is apprehended from Wounds that are inflicted upon the Vessels, which are situated upon the external Parts of the Body (some few excepted) because they will admit of the Ligature, and other Means for restraining the Violence of the Hæmorrhage: Nevertheless it is almost impossible to prevent the Limbs which lie below the Division of the Artery, and are used to receive their Nourishment by that Channel, from becoming paralytic; nay, sometimes, from mortifying: This is almost constantly the Case when the Trunk of the Brachial or Crural Artery is divided.

IX. The Consequences we have just related, follow upon the total Division of a considerable Vein or Artery: It remains now that we consider what will follow upon a partial Division of them. Whenever a large Artery is wounded, and not entirely divided, the wounded Fibres instantly contract themselves; by this Means they dilate the Orifice of the Wound, and render it difficult to stop the Flux of Blood; and though the Hæmorrhage be stopped for a little Time, yet it will burst out again on a sudden violently, or at least produce a dangerous Tumor, called an *Aneurism*. This will frequently be the Case, when only the external Coat of the Artery is wounded: For by this Means the internal Coat of the Artery is left to sustain the whole *Impetus* of the Pulse, which being unequal to, it is forced by Degrees into a Tumor like a Bag, whence frequently ensue the most calamitous Consequences. But of this Case we shall treat more fully in another Part of this Work.

Consequences following from a wounded Nerve.

X. Upon the Division of a Nerve, the Limb to which that Nerve was extended becomes instantly rigid, void of Sensation, and withers; so it is no wonder that a Man instantly expires upon the Division of those Nerves that are sent to the Heart, or *Diaphragm*. A Wound also is attended with great Danger, where the Nerve is only partially wounded, and not entirely divided; for the wounded Fibres contract themselves, and those that remain undivided suffer too great Extension, which will bring on most violent Pain, Spasms, Convulsions, Inflammations and Gangrenes, and sometimes Death itself.

Consequences of a wounded Tendon.

XI. When a Tendon is wounded or divided, the Part to which it belongs loses its Motion; but if it is divided only in Part, it will produce much the same Symptoms with a Nerve in the same Circumstances. The consequence of Wounds upon the internal Parts, you will find more fully explained when we come to treat of the *Diagnosis* and *Prognosis* of Wounds.

Of the Diagnosis of Wounds in general.

XII. The *Diagnosis* of Wounds is for the most Part extremely easy, for the Size, Situation, and Nature of the Wound, generally lies open to the Sight. Nevertheless there are some Cases that are not very uncommon, where it is somewhat difficult to discover the true Nature of the Wound. But in order to make the more easy Discovery, whether the Wound is deep or superficial, whether any of the internal Parts are wounded or not, the Surgeon should always be careful upon the first Visit to clean the wounded Part with a Sponge squeezed out of warm Wine or Water, that he may have a clear View of the Bottom of the Wound. But whenever the Flux of Blood from the Wound is very violent, it must be instantly dressed up, and the cleaning of it in this Manner deferred, till it is in a quieter Disposition.

What internal Parts are wounded may be discovered,
1. By Anatomy.
2. By the Posture of the wounded Person.

XIII. In deep Wounds we are to examine, whether the fat and fleshy Parts are the sole Objects of the Wound, or whether some considerable Blood-vessels, or other internal Parts, are not Partakers of the Injury. We are assisted in this Examination by several Means. Our first Assistance we receive from the Knowledge of *Anatomy*, since by that Science we are taught the Situation of each particular Artery, Nerve, Tendon, Viscus, and Intestine. The *Posture of the wounded Person* at the Time he received the Injury is also to be diligently considered, whether he was standing upright, or lying down, and to which Side he inclined; by this Means we may with some Certainty judge what Parts were Sufferers by the Wound, and how far the Weapon penetrated. We are also to consider of the *Posture, Manner, and Force used by the wounding Person*; for the greater degree of Force there was in dealing the Blow, so much the larger and deeper will the Wound be. Nor should we neglect here to enquire after the *Shape of the Weapon* by which the Wound was inflicted, since by considering its Size, and observing the Quantity of Blood that adheres to it, we may in some Measure judge of the Depth of the Wound.

3 By the Posture and degree of Force used by the wounding Person.
4. By viewing the Weapon.

5. By the Disturbance given to Actions of particular Parts.

XIV. In a word, there is nothing will give you truer Light into the Nature and Consequence of a deep Wound, than a due Consideration of what natural Actions of the Body are impeded or disturbed thereby. For instance, in Wounds of the Breast, when the Patient draws his Breath with Shortness and Difficulty, and is at the same time attended with an *Hæmoptysis* and Hiccoughs, we may fairly conjecture that the *Lungs* or *Diaphragm* are wounded; though the Hiccoughs often arise too from Wounds in the Stomach, in the Bladder, and other internal Parts of the Body: So in Wounds of the Abdomen, when Chyle is voided,

voided, it is a plain Indication that the *Stomach*, the *small Intestines*, or the *Lacteal Vessels* are wounded. When Excrements pass by the Wound, the *large Intestines* are wounded. In the same manner, an Effusion of Bile shews the *Liver* or *Gall-Bladder* to be divided. If Urine passes by the Wound, the *Bladder*, or *Ureters* are injured: but bloody Urine denotes a Blow on the *Kidnies*, or a Wound of the *Bladder*; but when the Discharges of Blood this Way are violent, it is a strong Indication that some of the larger Blood-vessels must be wounded. Vomiting of Blood, for the most part, declares the *Stomach* to be the injured Organ; *violent Pains*, attended with *convulsive Twitches*, shew that a Nerve is wounded, or that some foreign Substance is left in the Wound. Whenever the Senses are disordered after a Wound received upon the Head, a Concussion of the Brain is much to be feared.

XV. What we have laid down concerning the general Method of forming the *Diagnosis* on Wounds, will also serve us in forming their *Prognosis*, or Judgment Of the Prognosis of Wounds, of the Consequences that will attend them: For after a due Consideration of the Nature of a Wound, and the Symptoms attending it, it will be no very difficult matter, to determine whether it be attended with great danger or not, whether the Cure will be difficult or easy, whether it will be a perfect or imperfect Cure. We may remark in general, that slight Wounds admit of an easier Cure than deep ones: Young Patients, or those of a sound Constitution, are easier cured than the old or diseased, particularly than Hydropical, Consumptive, Scorbutical, or Pocky Persons. The cure is easier performed in a *temperate Air*, than in a cold or hot Climate. There are also greater hopes of Success where there are no violent Symptoms attending, as profuse Hæmorrhages, large Tumors, vehement Pains, Convulsions, Inflammation, Fever. But HIPPOCRATES has very rightly remarked^a, “Where a large Wound is made, it is a very bad sign if no Tumor succeeds.” This CELSUS has explained in a much more elegant manner^b: “It is of bad consequence for a Wound to be attended with a large Tumor, but it is of the last consequence if it is attended with no Degree at all of Tumor; the first is an Indication of great Inflammation, the last of Mortification.” Some Degree of Tumor therefore is best.

XVI. We come now to enquire what *Wounds admit of Cure*, and what are *incurable or mortal*.Whether Wounds are curable or incurable. The Knowledge of this Point is no less useful and necessary to the Physician and Surgeon, than it is difficult to attain: And more especially as the Law inflicts a very heavy Punishment upon Murderers, it is of very great Consequence to be able to distinguish what Wounds are of themselves mortal, and what only become so by Accident or Neglect; that the Guilty may receive their just Sentence, and the Innocent be freed: On which Account the most eminent Physicians and Surgeons are often called in, and, with great Reason, by the Administrators of Justice, in all Cases of Difficulty or Uncertainty. In order to enable the Surgeon to answer Questions upon this Head with greater Readiness and Certainty, we shall be very particular in this Article. Therefore in this View we shall divide Wounds into three Sorts. Some Wounds, 1. Are absolutely of themselves mortal: others, 2. Are in their own Nature mortal, if not relieved by timely Assistance: others, lastly, 3. Become mortal by Accident or imprudent Treatment, though they were otherwise curable.

^a HIPPOCRATES. Aphorism, 66. Sect. V.

^b Book V. Chap. 29.

XVII. We

1. Mortal Wounds.
2. Where there is an Hæmorrhage not to be stopped by Art.

XVII. We properly style those *Wounds mortal, which are not to be remedied by all the Art and Industry of Man*. So those Wounds are justly deemed mortal that are attended with so violent an Hæmorrhage as to produce instant Death. In this Class are reckoned Wounds that penetrate the Cavities of the Heart, and all those Wounds of the *Viscera* where the larger Blood-vessels are opened. Such are large Wounds of the Lungs, Liver, Spleen, Kidnies, Stomach, Intestines, Mesentery, Pancreas, Uterus, Aorta; of the Iliac, Cæliac, Renal, Mesenteric, Carotid, and Crural Arteries, (especially if they are wounded near their Origin) of the Subclavian also or vertebral, of the Vena Cava, the Iliac Vein, internal Jugular, Vertebral, Renal, Mesenteric, of the Vena Porta, and of other large Veins that lie deep in the Body, because their Situation will not admit of proper Applications to restrain the Flux of Blood. I think therefore I may very justly reckon these amongst the Wounds that are absolutely incurable, since they are not remediable either by Astringents, Ligature, or Fire. We may refer also to the same Class the Wounds of the Brachial Artery, if near its Origin; for the large Effusion of Blood generally destroys the Patient before Assistance can be procured; more especially if the Artery and Vein are both wounded together.

2. Where the Communication is cut off between the Head and the Body.

XVIII. Those Wounds are no less mortal than the former, *which obstruct or entirely cut off the Passage of the Animal Spirits to the Heart*. Such are Wounds of the Cerebellum, Medulla Oblongata, and all violent Strokes of the Brain itself. There is Reason to apprehend very great Danger, when the small Veins or Arteries which are contained in the Cranium are injured; for the Blood flowing from them into the internal Sinuses of the Brain, either produces too great a Pressure upon those very tender Parts of the Brain, and so obstructs the Course of the Blood and Spirits; or being corrupted, putrefies the Brain, if it cannot be evacuated by the Assistance of the Trepan, which is the Case when this Accident happens at the lower Part of the Cranium, or in the Sinuses of the Brain. Nor is there less Danger, where *the Nerves which tend to the Heart, or the Cerebellum*, are wounded, or entirely divided; for after this, it is impossible for the Heart to continue its Motion.

3. Where the Power of Breathing is taken away.

XIX. To this Class also are to be referred *all Wounds that entirely deprive the Animal of the Faculty of Breathing*. Therefore there is great Danger where the *Aspera Arteria* is completely divided; for where it is only divided in part, it may be healed again by the Assistance of an expert Surgeon. I have many^a Histories of Cures of this Kind, both by myself and others. To this Place also belong violent Shocks of the *Bronchia*, (as the *Par Vagum*, or *Intercostals*) *Mediastinum*, and Diaphragm, especially the tendinous Part of it.

4. Where the Course of the Chyle is interrupted.

XX. Those Wounds, also, *which interrupt the Course of the Chyle to the Heart*, are no less incurable than the former: Such are the Wounds of the Stomach, Intestines, Receptacle of the Chyle, Thoracic Duct, and larger Lacteals: to which we may add Wounds of the *Œsophagus*, if they are large; though Death is not so sudden an Attendant upon these Wounds, but for Want of Nourishment they are greatly weakened by Degrees, and die consumptive.

^a See BOHNUS de Vuln. renunc. Pag. 21. though he reckons these among incurable Wounds.

XXI. In this Place we must by no Means omit to speak of *Wounds which are inflicted upon the interior membranous Parts that contain some secreted Fluid*, as on the Bladders, either for the Bile or Urine, the Ureters, Stomach, Intestines, Receptacle of Chyle, and Lacteal Vessels. The Fluids contained in these Parts, when once they are let loose into the Cavity of the Abdomen, cannot be properly discharged, and therefore easily corrode the internal Parts of the Body; and the Membranes that contained them are generally so fine, that they will not admit of Agglutination, especially since no Medicine from without can be applied: A few, indeed, have recovered after slight Wounds in these Parts, but since that Number is but few, and the Cure was accidental, and not performed by the Surgeon's Art, I think I am sufficiently justified in adding these to the Number of incurable Wounds.

5. Where the abdominal Fluids which are contained in Membranes are extravasated.

XXII. We have hitherto been treating of Wounds that were curable by no Art or Industry; we proceed now in order to describe those *which prove fatal, if neglected and left to Nature*. By these we mean those Wounds that produce instant Death, unless relieved by present Assistance, but are curable by a good Surgeon called in time; such are Wounds of the larger external Blood-vessels, which might be remedied by Ligature, by the Application of astringent Medicines, or of the actual Cautery. Of this kind are Wounds of the Brachial or Crural Artery, unless they are too near the Trunk of the Body. Wounds in the large Arteries of the Cubit or Tibia, of the Branches of the external carotid and temporal Artery, are of this kind; to these may be added Wounds of the Jugular, and other Veins situated upon the external Parts of the Body; but in these Cases we always suppose that Help is called for before there has been a vast Profusion of Blood.

II. Wounds proving mortal, if left to themselves.

XXIII. *Wounds are properly said to become mortal by Accident, where the Patient's Death is occasioned either by the ill Conduct of the Patient himself, or by the Ignorance or Neglect of his Surgeon, the Wound itself being deemed curable*. Under this Head are to be reckoned, 1. *Those Wounds which the Surgeon has neglected to cleanse sufficiently, though he had it in his Power to do it*; as when some foreign Body, which might easily have been extracted, is left in the Wound by the Carelessness of the Surgeon, and produces Inflammations, Hæmorrhages, Convulsions, and at last Death itself. So in Wounds of the Thorax and Abdomen, if the Surgeon does not use his utmost Diligence to evacuate the grumous Blood, it will corrupt there, and by drawing the neighbouring Parts into consent, will expose the Patient to instant Death^a. Therefore great Care must be taken that

III. What Wounds become mortal by Accident.

^a There are some Cases where the Surgeon finds all his Attempts to evacuate the Blood fruitless, and there he is in no wise to be blamed, but the Wound is to be looked upon as mortal. Take the following Case by way of Example: In the Year 1725, a Man received a Wound by a Sword: the Sword entered about half an Inch below the right Pap, between the fifth and sixth Ribs, and passed downwards through the Diaphragm into the Cavity of the Abdomen. Now although a considerable Quantity of Blood was discharged by the Wound for the three first Days, yet it was impossible that the Blood which was extravasated in the Cavity of the Abdomen, should be discharged by the Wound at the Breast, the Patient therefore died on the eighth Day. His Body being opened, we found a large Quantity of grumous Blood under the Liver, which adhered so strictly to its concave Part, that we found it difficult to separate them with our Fingers. Upon clearing away the Blood, we perceived a Wound through the Body of the Liver, about half an Inch wide, and a Wound answering to that in the muscular Part of the Diaphragm. There were two or three Ounces of Blood found in the lower Part of the Abdomen, but none in the Cavity of the Thorax. From

the Lips of the Wound do not close, till the Blood which is collected in the Cavity of the Body be all evacuated, if possible, which you will easily perceive by the difficulty of Breathing, and other bad Symptoms being removed ^b. But if any of the larger internal Vessels are wounded, then all Attempts to discharge the Blood are vain; for the violence of the Hæmorrhage takes off the Patient.

2. *Wounds also are reckoned mortal by Accident, which are treated or searched in too rough a manner by the Surgeon;* for if you handle Wounds roughly, that are full of nervous Parts or large Blood-vessels, there is great Danger of bringing on Hæmorrhages, Convulsion, Inflammation, Gangrene, and Death itself. The Case is also the same, 3. *In external Wounds which are slight of themselves, but the Patient is lost by the Violence of the Inflammation, which is brought on, and increased by the Surgeon's injudicious Treatment.* Or, 4. *When any one is taken off by the Violence of the Hæmorrhage from a Wound of the Hand or Foot;* for in this Case a Surgeon might easily have stopped the Blood by the Application of proper Remedies, or by the actual Cautery, or Ligature. Or, 5. *Where the Patient is guilty of any Intemperance in eating or drinking, of excess of any Passion, of exposing himself to the cold Air, or of using any violent Exercise.* For by this means Wounds, more especially those of the Head, by being liable to fresh Hæmorrhages, and other dangerous Accidents, frequently become mortal, notwithstanding the Surgeon uses his utmost Care and Skill. Under this Head also are to be reckoned, 6. *Those Wounds of the Head where the Patient is lost by the vast Quantity of Blood which is extravasated in the Cavity of the Cranium, and confined there; but where he might have been relieved if the Trepan had been used in time;* for though Wounds of this kind generally prove incurable, yet as there is a Possibility of saving a Person in these Circumstances by the use of the Trepan, this may properly be reckoned amongst the doubtful Cases, and not deemed absolutely mortal. Lastly, 7. *A bad Habit of Body frequently prevents the Cure of Wounds, which would admit of an easy Cure in an healthy Subject.* So you frequently see the slightest Puncture in the Hand or Foot of an Hydropical, Consumptive, or Scorbutical Person, shall produce a Gangrene, and prove mortal, though the Surgeon neglects no proper Application to prevent it. I know very well that some Physicians reckon all Wounds of this kind as absolutely mortal; but I think they are much better justified who pronounce a milder Sentence, and deem them of the doubtful Kind.

the Impossibility that appeared of discharging the extravasated Blood, and the Largeness of the Wounds of the Vessels, I pronounced this Wound mortal: but, to my great Surprise, some Physicians declared it so only *per accidens*, for which reason the Murderer was acquitted. Whose Opinion was most justifiable, I leave to others to determine. See *Fr. Hoffman. Consult.* Tom. I. p. 376. & seq.

^b The Surgeon is not to be blamed if he is sometimes deceived in this Point; of which I will here give you a notable Instance. In the Year 1726, a Man at *Helmstadt* was wounded in such a Manner under the right Pap, that the Blood did not only flow in great Quantities from the Wound, but discharged itself also by the Mouth: but in two Days time the discharge of Blood, both at the Wound and by the Mouth, through the Application of proper Medicines, entirely ceased, and the Patient found himself in so good Order, that he expected in a very short time to get abroad: He breathed so freely, that he easily prevailed upon me to remove the Tent that I had put in to keep the Wound open. But behold the Consequence! after remaining in this Manner entirely easy for two Days; on the third he died suddenly. Upon opening the Thorax, we found at least a Pound of concremented Blood, which could by no Means have been discharged, since there

XXIV. We have laid down these Principles to guide Physicians in giving their Opinions in Courts of Justice, concerning the necessary Consequences and Fate of Wounds. Although all Wounds should be examined upon these Occasions with great Circumspection, yet none require more careful looking into than Wounds of that Class which are described under N. XXII, because there are great Diffensions amongst the Learned upon this Head. Some are of Opinion, that the Wounds mentioned at N. XXII, are to be referred to the third Class, and so are to be reckoned mortal only by Accident, and by this Means they frequently acquit a Murderer. How they support this Opinion I cannot tell. For my own Part, whenever I have found a Man lose his Life by receiving a Wound in an Artery, at a Time of Night when a Surgeon could not be called, I have always determined that Wound to be mortal, and that the offending Party was guilty of the Murder. On the other hand, where a Wound of the same kind has been received in the Day-time, and the Patient has lost his Life by the neglect of the By-standers, in refusing to call proper Assistance, or by the Ignorance of the Surgeon; in these Circumstances I have always declared the Wound to have been mortal only *per accidens*, and have given my Opinion, that the accused Person ought to be acquitted, and the Surgeon indicted. But in order to form a proper Judgment in these Cases, it is necessary that we should be well informed of all the Circumstances.

It is difficult to form a Judgment concerning the Fate of Wounds.

XXV. In very doubtful Cases, to be sure the mildest Sentence ought to take Place, according to the old saying, *It is better to let ten guilty Persons escape, than to punish one innocent Man*: For to be too rigid in these Cases, will not only burden the Conscience of the Judge, but be also injurious to the Public.

What is to be done in doubtful Cases.

XXVI. For the use of the younger Surgeons, I shall here subjoin the Form which I always use in giving my Opinion into Court, concerning the Nature of a Wound.

The Form of delivering in a Surgeon's Opinion.

appeared no Symptoms which could give room to suspect that there remained any extravasated Blood concealed. Besides, BELLOST, DE LA MOTTE, and several other celebrated Surgeons amongst the Moderns, absolutely forbid keeping Wounds of the Breast open by the use of Tents, though I doubt much whether this Advice is always to be followed. But I leave this to the Determination of others.

• As an Example of this, take the following Relation. In the Year 1733, a Woman living in the Suburbs near *Brunswic*, walking out in the Evening just before the Gates of the City were shut, received a Blow on the Head from a Man with a large Club, which laid her flat upon the Ground, and left her quite senseless; when the Fellow saw this, he took to his Heels, and nobody was left near her, but her Husband and three small Children; the Man, frighted out of his Wits, ran about to see if he could get People to assist him to carry his Wife home (for she was a very large Woman) but the Night coming on he could prevail with no one, and the City Gates being shut, it was impossible to bring a Surgeon to her: the Woman therefore was left upon the Ground all Night, without any Assistance; and died the next Morning. When the Physicians and Surgeons came to examine her, they found a Fissure in the Cranium, and, upon raising the Scalp, they found a large Quantity of extravasated Blood under the *Dura Mater*, lying upon the right Lobe of the Brain, and therefore very judiciously determined it to be a mortal Wound. The Advocate for the Criminal opposed this Verdict, because there was no Surgeon called to treat her in a proper Manner, by which she might possibly have been saved; upon this Difference of Opinions I was called upon to determine this Matter. I declared as my Opinion, that if the Woman had been within the City, where she might have had the Assistance of Physicians and Surgeons, and had lost her Life through their Neglect or Ignorance, then the Wound ought to have been deemed mortal *per accidens*; but in the present Case, it was impossible she should have had any such Assistance, therefore her Death was occasioned by the Blow she received, and the Wound ought to be judged mortal *per se*.

“ I the underwritten, having this Day diligently examined the dead Body of
 “ A. B. in the Presence of C. D. E. &c. found it to have received the follow-
 “ ing Wounds: that is to say, in the back Part of the Body, under the right
 “ Shoulder, I discovered a Wound of the width of one Inch, through which I
 “ could pass my Finger with great ease, between the Ribs, into the Cavity of
 “ the Body. Upon opening the Breast, almost the whole right Side was found
 “ full of coagulated Blood, upon removing which, I found a Wound also pene-
 “ trating into the right Lobe of the Lungs, which not only pierced through
 “ this Lobe, but also divided some of the larger Branches of the pulmonary
 “ Vessels, with the *Bronchie* themselves. The Heart and all its Vessel were
 “ entirely empty: no Mischief appeared either in the Head or Abdomen. The
 “ Effusion of Blood, which was occasioned by dividing the Vessels in the Lungs,
 “ could not but bring on instant Death: Therefore I hereby declare this Wound
 “ to have been the Occasion of his Death. In testimony of the Truth whereof
 “ I have hereto set my Hand.”

N. N.

Done at the Day of
 in the Year of our Lord

Some gene-
 ral things
 with Respect
 to these
 Forms.

XXVII. Forms without Number may be made from this, by varying the Circumstances. But above all I would advise the young Surgeon to be very careful in examining the State not only of the wounded Parts, but also of the Contents of the Cranium, Thorax, and Abdomen, that he may observe whether any thing preternatural has happened in either of those Cavities. If any one is desirous of being more thoroughly instructed in the Method of examining the Bodies of murdered Persons, and in the proper Forms of making a Report, let him consult a *French* Treatise upon this Subject, entituled, *L'Art de faire Rapport en Chirurgie*.

The CURE of WOUNDS.

Cure of
 Wounds.

XXVIII. Since a Wound is a Solution of the Continuity of the Parts of the Body, the Reunion of those Parts seems to be the principal Intention. But since Wounds are of very different Kinds, some slight, and others of great Consequence, in Proportion to this Difference so will the Manner of prosecuting this Intention differ.

Cure of slight
 Wounds.

XXIX. The Cure of slight Wounds is generally performed with great Ease, by applying a small Portion of Lint to the Part, well saturated *cum Spiritu Vini, Oleo Olorum, Terebinthinae, Hyperici, Linimento Arcei, Balsamo Copaibae, de Mechâ, Peruviano, &c.* securing the Dressings with a ^a Plaster to keep the Wound clean. The Dressings should be renewed once in a Day or two, and the Lips of the Wound will presently agglutinate: Therefore, in Cases of this Kind, a Surgeon is very rarely applied to.

Dangerous
 Wounds
 how to be
 treated.

XXX. Wounds which are attended with some Danger, where the Substance of the Part wounded is not impaired, are to be treated as follows. If there be too copious a Discharge of Blood, the Hæmorrhage must be stopped at the first Dressing: If not, the Wound in the first Place is to be cleansed from all extravasated Blood, Sordes, &c. In the next Place, if a Bullet,

^a The Plasters I chiefly use are *Empl. Diachyl. S. Diapalm. or Stypticum Crollii.*

the

the Point of a Sword, any Part of the Clothing, a Piece of Glass, Splinter, or any other foreign Body, shall remain in the Wound, it is to be removed with the Fingers, or with proper Instruments, as shall be explained more fully below. Then the divided Parts are to be brought as near each other as possible, and their Situation is to be so maintained, by proper Bandages, that the Cicatrix which is left may appear even.

XXXI. Foreign Bodies are removed from Wounds either by the Surgeon's I. Method Fingers, or by such Instruments as we have described at *Plate III, Fig. 3, 4, 5,* ^{used in} *6, 7, 8,* having first enlarged the Orifice of the Wound, if there be Occasion. ^{cleaning} *Wounds.* But where there are no extraneous Bodies to be removed, and the Hæmorrhage is not large, the grumous Blood is to be wiped away with a soft Sponge, or some fine Lint, wrung out of hot Wine or Brandy: having done this, you must proceed to dress, and lastly to agglutinate the Lips of the Wound.

XXXII. Before a Surgeon attempts the removal of extraneous Bodies from a Wound, it behoves him well to examine whether this is to be done instantly, or whether it is not best to wait for a more convenient Time. For if the Patient is become extremely faint, from the Loss of Blood which he has already sustained, it will be necessary here to stop the Hæmorrhage, and to endeavour in some Measure to revive him with moderate Draughts of warm Broths, White Wine Whey, or of some cordial Medicine: For if some such Precautions are not taken, the Patient may not unlikely die in the Operation. So, where you have Reason to apprehend, that, in extracting the broken Point of a Sword or Spear, you are in Danger of wounding a large Blood-vessel or Nerve, it is better to wait a little till the Patient comes to himself, or till the Wound is somewhat enlarged by the Suppuration of the Parts. All these Circumstances will be well weighed by the prudent Surgeon.

XXXIII. Foreign Bodies, as the Points of Swords, Spears, &c. should always be extracted from Wounds by the Hand if possible; and this should be done with all the Expedition, Tendernefs, and Care that may be, taking great care not to wound the neighbouring Parts; but if there are any Bodies that cannot be removed by the Hands, then you must have Recourse to such *Forceps* as we have described in *Plate III, Fig. 3, 4, and 5.* The same Assistances also we make use of in extracting Bullets, broken Pieces of Steel, Glass, &c. We shall speak more clearly of the Method of extracting Bullets, when we come to treat of Gun-shot Wounds. Where the Wound is too narrow to admit of the Extraction of a foreign Body without lacerating the Parts, it must be dilated with the Knife, according to the Direction of the muscular Fibres. The Extraction will admit of no Delay, but for Reasons of great Moment, (*N. XXXII.*) besides, whilst the Wound is recent, and the Lips of it not swelled, it will suffer less Pain in handling; and the Patient, from a strong Desire of living, will at this Time endure more than afterwards, when he comes to reflect.

XXXIV. The Wound being cleansed from Blood, and all extraneous Bodies, ^{II. Of uniting} *and the Hæmorrhage stopped,* ^{dangerous} *it now becomes the Business of the Surgeon to* ^{Wounds.} *close the Lips of the Wound, and to consider what is proper to be done to keep them in that Situation, that the Parts may speedily unite. Different Methods are used in prosecuting this Intention, according as Wounds differ in their Consequences, and in the Number and Degree of Symptoms attending them. For simple and slight Wounds require not the same Treatment as those which*
 are

are attended with dangerous Symptoms, or where the wounded Parts are torn and mangled. Again, Wounds, which penetrate into the Cavities of the Body, especially if any of the Viscera are injured, demand a different Method of Cure from those which are inflicted on the external Parts. And, lastly, another Distinction must be considered, whether the Wound was made by a Stab, or a Puncture.

Method of
treating a
Puncture.

XXXV. Amongst the Number of the most simple Wounds, we reckon those which are made by Puncture, or stabbing, upon the external Parts, and not penetrating deep. In these Wounds, after the Blood has been stopped at the first Dressing, by the Application of dry Lint, the common Digestive, or *Balsamum Arcæi*, or any of the vulnerary Medicines recommended in the Introduction, N^o. XXXVII. is to be spread upon a Pledget, and applied once every Day; or if the Discharge is but small, every other Day, covering the Dressings with a Plaster and Compress, and securing the whole with a proper Bandage. At every Dressing you should be careful to remove every thing that will give way readily; the Pus, or Sanies is to be gently wiped off with fine Rags. It may be remarked in general, that too frequent Dressings do more Harm than Good, unless a more than ordinary Discharge of Matter, particularly in the Summer Time, or any other bad Symptom, require it: The Truth of this is attested by CÆSAR MAGATUS, in his Book, *De rarâ Vulnerum Deligatione*; by BELLOSTE, in his *Hospital Surgeon*, and others amongst the Moderns; not to mention my own Experience upon this Head. The first Dressings that are applied, especially where there has been a Flux of Blood, should by no means be removed forcibly, but be left till they fall off of themselves, which they will do, when the Suppuration is formed: By this Means much Pain, and perhaps a fresh Hæmorrhage, may be avoided. But when a punctured or stabbed Wound penetrates very deep, the Cure is attended with many Difficulties, especially if a Nerve or Aponeurosis is lacerated, if the Wound is made perpendicularly down, and has no depending Orifice; for in this Case the Blood and Matter are easily collected at the Bottom, protract the Cure, and frequently form Fistulæ. To prevent these Consequences, it will be proper to press the Wound from the Bottom upwards; to apply a Compress towards the Fundus of the Wound externally, and to apply what is called the *expelling Bandage* over all, which presses much tighter upon the lower than the upper Parts.

A new
Opening is
frequently
required.

XXXVI. But if all this Precaution should prove of no Effect, which is frequently the Case, it will be best to make a large Opening at the Bottom of the Wound before any Fistulæ are formed. In order to make this Opening to the greater Advantage, it will be proper to get a particular Sort of Probe or Needle, very blunt at Top, as at the Letter A; but at the other End provided with a large Eye or Hole through which a Linen Rag may be passed, (*See Plate V, Fig. 1.*) This Probe is to be passed to the Bottom of the Wound, and the blunt Part of it pressed outwards towards the Skin, till you can feel it with your Finger. When you have felt it, cut down upon it, if you can safely, and make a large Opening, spread the Rag that you have run through the Eye of this Probe with some vulnerary Balsam, and draw it through the Wound after the Manner of a Seton, especially in Gun-shot Wounds, and leave it there, dressing up both the Orifices with the same Balsam, covering the Dressings with Plasters and proper Bandages. In every succeeding Dressing, the Part of the
Rag

Rag that is left out of the Wound is to be spread with fresh Ointment, and the lower Part drawn down till this takes Place; and this Method is to be continued till the Wound is well cleansed, the Discharge greatly diminished, and all in a Readiness to heal: The Seton is then to be removed, and the Wounds healed as usual.

XXXVII. GARENGEOT describes a triangular Instrument, invented by Another Method of doing, it. PETIT, for this Purpose, which the *French* call *Trois quarts*: With this he makes an Opening at the Bottom of the Wound or Fistula, and introduces a Rag, which is passed through the Eye of this Instrument, and then through the Wound or Fistula, (*See Plate IV, Fig. 1.*) But as this Instrument is strait, and I have frequently met with Cases where that Form would not answer the Purpose, therefore I invented another, long before GARENGEOT's Book came out, for the Use of a Nobleman, who had a large Abscess in the fore Part of the *Abdomen*, which opened near the Navel on the right Side, but penetrated as far as the Groin on the same Side. The Situation of the crural Vessels, in this Case, would by no Means admit of a new Opening, being made by a strait Instrument. I invented therefore a crooked one, somewhat like the Instrument that is used to draw Water off in hydropical Cases, but longer, because the Fistula was of a great Length; (*See Table IV, Fig. 2.*) by the Assistance of which, whilst I directed the Apex towards the Skin, I easily made a new Aperture, without endangering the crural Vessels: And that I might at the same Time introduce the Seton, I contrived a Sulcus near the End, to which I fastened a strong Thread, and by drawing back the Instrument, I easily introduced the Seton through the Fistula. When the Seton was near all used, I sewed new Cloth to the old, and so introduced it through the Wound, cutting off the foul Part, going on in this Manner till the Wound was sufficiently cleansed, and so preventing the Necessity of frequently introducing the Instrument.

XXXVIII. It is to be remarked here, that although, in some Wounds, it is no Cautions concerning Healing. Matter how soon you suffer the Opening to heal; in this case, on the other Hand, you must take great Care that the Orifices are not healed before the Bottom of the Wound. This may be done by the Assistance of a Cloth somewhat twisted, by the *French* called *Bourdonet*, or a short soft Tent. But when it is healed from the Bottom, you may remove the Tent, and heal the Orifices. How Wounds of this kind, which penetrate into the Cavity of the Thorax or Abdomen, are to be treated, will be taught below in the Vth and Xth Chapters.

XXXIX. Wounds which are made by a cutting Instrument, where no Part Method of treating a Cut. of the Flesh is taken off, and the Accident happens to the external Parts of the Body, and does not penetrate deep, after they are cleansed should be dressed with some ^b vulnerary Balsam, and the Lips of the Wound should be closed and kept in that Situation: This is done after different Methods, according to the difference of the Wound. 1. This is to be obtained by placing the wounded Part

^a *Traité des Instrumens*, Tom. I. pag. 391.

^b Besides the Medicines, which we have recommended above, at N^o. XXIX, we may add here *Essentia Succini Terresbintina, Mastichis, Myrrha & Aloes, Gemmarum Populi*, &c. We must observe, too, that where a Contusion is added to the Wound, which is the Case in Wounds made by Glafs, Saws, &c. the mildest vulnerary Oils and Balsams are to be applied, as *Ung. Digestivum*, or *Balsam. Arcei*; but in those made by Knives, Swords, &c. the Essences and Balsams which we have just described are to be preferred, as being more astringent and drying.

in a proper Posture; as soon as the Wound is dressed, the Part should be placed in such a Situation, that the divided Parts may be most likely to be in constant Contact, repeating the Dressings once a Day, as we observed before, N^o. XXXV, or at least every other Day. 2. By proper Bandage; tying up the Parts so that the Lips may meet, and so easily unite. This is attended with the greatest Success in Wounds that are made lengthways, as in the Fore-head, Abdomen, Arms or Legs; for in this Case the uniting Bandage at Plate II, Lett. F. answers the End completely. 3. By a proper Suture, which differs according to the Difference of the Wound, but may be generally divided into the dry and bloody Suture. The dry, or, as some call it, the *bastard Suture*, is the Application of sticking Plasters to keep the Lips of the Wound united: The bloody, or true Suture, is performing the same thing with a Needle and Thread.

What Wounds require a Suture.

XL. All Wounds are not to be united by the Needle; but those only that are oblique, transverse, or angular, and at the same Time very large and deep; or in Cases where a Part is near cut off, as in the Nose, Ear, Chin, Cheeks, &c. if a Wound is so circumstanced, that it cannot be kept in a proper Situation by Plasters and Bandages. 1. Wounds that are to be stitched should be in their recent State, and properly cleansed from extravasated Blood, and all extraneous Bodies. 2. There should be no Loss of Substance, except in those fleshy Parts that are easily elongated, as the Lips. 3. There should be no Inflammation or Contusion. In these Cases the Lips of the Wound are closed more elegantly and more successfully by Suture. On the contrary, Wounds of long standing, rancid or foul, attended with Venom, or that have their Seat in the Breast; or, lastly, where the larger Arteries, Veins, or Nerves are injured, cannot be sewed up without imminent Danger.

When, and in what Manner, the dry Suture is to be performed.

XLI. The dry Suture is to be used in slight Wounds, and especially when they happen in the Face, and indeed wherever you think it is of Force enough* to keep the Lips together: As it gives no fresh Pain, and occasions no Scar; it is much fitter for Wounds of the Face than the Needle, especially as the Needle beside the Pain and Scars it occasions, often produces no small Inflammation. The Plasters which are to form the dry Suture should be of a sufficient Length, and shaped like the Part to which they are to be applied, so as to surround the greatest Part of it; but not the whole, lest they should retard the Circulation of the Blood, and bring on Tumors and Mischiefs of that kind. They must also stick very fast: which Purpose is excellently well answered by the *Emplastrum ANDREÆ A CRUCE, vel Stypticum CROLLII, vel Diachylum, vel Diapalmæ, Terebinthinâ probe subactum*. The Hæmorrhage being stopped, and the Wound well cleansed, some tenacious vulnerary Balsam, such as *Essentia Mastichis, Succini, Balsami Peruviani*; or the *Balsamum Præseñi Equitum Meliten-sium*, which you will find described in LEMERII *Pharmacopœia Universalis*, under the Title of *Balsamum Equitis Sancti Viſtoris*. These, and indeed all Balsams of the gummy Kind, best answer the Intention in this Place, for they presently form a sticky balsamic Crust, which denies all Entrance to the Air, and presently brings on the desired Union; but over this a sticking Plaster is to be laid, adapted to the Size of the Part; you may apply two or more, according as

* Where the Finger has been cut almost off, so as to hang by a Piece of Skin, and the Surgeons have advised it to be taken off, I have cured it by this Suture frequently, and the Bones have united.

you

you see Occasion, leaving a Space between. The manner of applying them you will see at *Plate IV, Fig. 3, 4, 5.* they are to be secured in their Situation by the Application of proper Boulsters and Bandages.

XLII. According to PETIT's Method, the sticking Plasters should have one, two, or more Openings in the Middle, *See Plate II, Fig. 11.* or in the Manner of those at *Plate IV, Fig. 7.* that you may discover through these, as by the Spaces left between, in the former Method, whether the Lips of the Wound were properly united or not: And that you may also be able to apply proper Remedies to the Part, without removing the Plasters. These Plasters are applied in the same Manner as the former, and left on till the Work is completed. But the dry Suture may be formed also after another Manner; to wit, make two Plasters after the Prescription of ANDREAS A CRUCE, spread upon strong Cloth, answering in Size to the Wound; to the Sides or Margin of these fasten three or four Tape-strings, according to the Length of the Wound: And then, after warming the Plasters, apply them on each Side of the Wound, about the Distance of a Finger's Breadth from it, after the Manner described at *Plate IV, Fig. 8.* After this bring the Lips of the Wound together, dress it up in the Manner we have described above, and whilst an Assistant keeps the Lips of the Wound in their proper Situation, let the Surgeon tie the Ends of the Tapes, first in a single Knot, and then in a slip Knot, to keep the Parts in Contact. Over each should be laid an oblong Compress, and over all of them a large square one, the whole to be bound up with a proper Bandage. On the next Day the Wound is to be examined, and if the Tapes are loosened they must be drawn tighter again; but if they are not loosened, let them remain untouched, only moisten the Parts with a few drops of Balsam, covering them up again with the Compresses and Bandage as before. If they are too tight, and a violent Inflammation succeeds, they may be relaxed at Pleasure; but on the Decrease of the Inflammation they must be tightened again. Some, in the Room of Tape, use Clasps, made of Steel or Brass, as we have described them at *Plate IV, Fig. 9 and 10.* But this Method is less convenient than the former, and therefore in very little Use.

XLIII. In large Wounds, especially transverse ones, as their Lips cannot be maintained in their Situation by the dry Suture, which is frequently the Case in Wounds of the Thigh, as you may see at *Plate III, Fig. 1, Letter H*; or in the Abdomen, Nates, or Arms; or where Pieces hang from the wounded Part, as in the Forehead, Cheeks, Nose, or Ears; or when large Wounds are made in an angular or cruciform Manner, as at *Plate IV, Fig. 12, 13, 17.* here you must use the Needle, which Operation is called the *bloody, or true Suture.* The true Suture is distinguished again into the *simple* and *compound.* The *simple Suture* is that which is performed only by the Assistance of the Needle and Thread; to this Class belong the *interrupted Suture*, the *Glover's Suture*, and the *twisted Suture.* The last is seldom used but in the Hare Lip; the second only in Wounds of the Intestines, under which Head we shall treat of it more largely; but the first is in common Use for all Wounds that require the true Suture, therefore we shall begin with the Description of that before the rest. The *compound Suture* is that which requires other Assistances besides the Needle and Thread. Of that below.

XLIV. The best Method of making the *interrupted* or *knotted Suture*, I take to be the following one: Take a double Thread well waxed, pass it through a

G

strong Suture.

Other Methods of making the dry Suture.

The bloody Suture what.

How to perform the interrupted Suture.

strong crooked Needle, as you may see *Plate I, Lett. S, T, V, or Plate VI, Fig. 5 or 6.* When the Lips of the Wound are brought together, and held firm in that Situation by an Assistant, with one Stroke pierce through them both, passing your Needle through the lower Lip from without inwards almost to the Bottom, and so on from within outwards, observing to make the Punctures at a Finger's Breadth from the Wound, (which in this Case we will suppose to be in Length two Fingers) varying this according to the Size of the Wound. After taking off the Needle, tie the Ends of the Thread, first in a single Knot, and then in a slip Knot, covering all with the Dressings which we prescribed in the dry Suture. But if the Wound is of such a Length, that one Stich will not be sufficient, then you may make two, three, or more after the same Manner that we have now described, always observing a Finger's Breadth Distance between each Stich. See *Plate IV, Fig. 11 and 16.* But to prevent the Knots from bringing on any Mischief, lay a small Linen Compress (*See Plate II, Fig. 22.*) over the single Knot, and make the slip Knot over that; which, if any Pain or Inflammation should succeed, may be easily loosened.

Some Caution.

XLV. We proceed in this Manner in oblique or tranverse Wounds. But where there are Angles, as in a triangular Wound, *Plate IV, Fig. 13.* you are to proceed in the same Manner as before; only the Suture must begin at the Angle A; then the Sides of the Wound must be stiched about the Middle at B and C. If the Wound is quadrangular, or has two Angles like the Greek Letter Π , which sometimes happens in the Face, *See Plate IV, Fig. 14.* then the Sutures must be made in both the Angles A A. But when the Wound is so large, that these are not sufficient, then as many more as are necessary must be made in the middle Way between the Angles B B. When you meet with a cruciform Wound, as at *Fig. 6 and 12.* and the Lips of it cannot be kept in Contact by the Use of Plasters, the Needle, as at *Fig. 12.* must be passed in at A, and come out again at B; it must enter again at C, and come out again at D; the Extremities of the Threads must then be tied in the Manner we have before directed, between A and D. How the Wounds are to be treated afterwards we shall explain below.

The compound Suture.

LXVI. Some of the Surgeons amongst the Ancients used a *compound* Suture for large Wounds, in the Room of the interrupted Suture, which was made of two Pieces of Wood, by the French called *Chevelle*; and from thence the Suture was styled *Enchevillée*. And they preferred this, because it prevented the Lips of the Wound from being lacerated, which sometimes happened when the other Method was used, which not only prevented the Wound from uniting, but frequently brought on other grievous Disorders. And though this Method has of late Years been rejected as inconvenient, and particularly by DIONIS in his Surgery; yet it is not at this Day without its ^a Advocates, who highly commend it, and prefer it to the interrupted Suture in many Cases: But they use it with this Difference, that instead of two Pieces of Wood, they use Pieces of Plaster rolled up in a cylindrical Form, of the Length of the Wound, and about the Size of a Goose Quill, from whence it is by some called the quilled Suture. *See Plate IV, Fig. 17 and 18.* This Method prevents Tumors, Pain, and Inflammations, that might be brought on by the Hardness and Pressure of the

^a As PALFYNNUS, in *Chirurgia*, Cap. VI. de Sutura; and since, GARENGEOT in *Chirurg.* Cap. de Sutura.

Wood. PALFYNS performs this Operation, in deep Wounds of the muscular Parts, (as the Thighs, Buttocks, Legs, Arms, &c.) with a large, strong, crooked Needle, furnished with a strong double Thread well waxed, (*See Plate IV, Fig. 15.*) which makes a Bow at one End. The Needle being passed through both Lips of the Wound, in the Manner we have before described, and a second and third passed in the same Manner, as is shewn at *Fig. 17.* a Roll of Plaster is to be introduced into the bow Ends of the Thread, which are left hanging out at BB. Then when the Needle is taken off at the other Side, another Roll is to be placed between the Ends of the Thread; and the Lips of the Wound being brought together, these Ends are to be gently tied over the Roll, first in a fingle, and then in a slip Knot, as at CCC. If there are three Threads, you are to tie the Middle first, and then the rest, treating the Wound afterwards, as we shall shew below.

XLVII. GARENGEOT performed this Operation much after the same Method we have just described, (*See his Book of Operations in Surgery, Chap. iii. on Sutures*) but with this Difference, instead of a double Thread, he made small Ligatures of six or eight Threads (according to the Size of the Wound) joined together and waxed, always observing not to make it so big, that when it should be doubled it should exceed the Size of the Needle, lest it should create Pain, by not passing readily after the Needle. When a sufficient Number of these Ligatures are passed through the Lips of the Wound, he makes a Knot upon each of the Ends that hang out of the upper Lip; *See Plate IV, Fig. 18. DDD,* and then unravels the Threads that compose the Ligature, between the Knot and the Lip of the Wound; and by this Means forms a Passage through which he can introduce the cylindrical Roll of Plaster. After this he claps two Fingers upon the lower Lip of the Wound, near the Punctures which were made by the Needle, and with the other Hand draws back the Ligature gently, beginning in the Middle, if there are more than two, till the Wound is exactly closed: Then he divides the Threads of each Ligature into a two Parts, with which he ties the other Roll as before, nicely joining again the Lips of the Wound. In tying these Ends, great Care should be taken not to make the Knots too tight at first, lest they should bring on Pain and Inflammation. The Wound is now to be covered with vulnerary Balsams spread on Lint, but especially with the *Balsamum Praefecti Equitum Melitensum*, which I have commended before, as it soon forms a healing agglutinating Crust, denies all Access to the external Air, and brings on the desired Union, to which you must add a Compress, a proper Bandage, and a convenient Posture of the Part affected.

XLVIII. On the first Days, after whatever Method the Suture is performed, the Bandage and Compress are to be gently removed, and the state of the Wound examined. If every thing looks well, and there is little or no Pain or Inflammation, the Sutures are to be let alone for six or seven Days, or longer, and the Wound be dressed up again as before, till it appears that there is a strict Union procured. But if the Stiches should appear to be too loose, the Knots should be tightened; if they are too tight they must be loosened a little. When the Lips of the Wound appear to be enlarged or bruised, they should be dressed with a digestive Ointment, or with the *Balsamum Arcaei*, the con-

* GARENGEOT here orders them to be separated into three Parts, but what Use he puts the third Part to I can't comprehend; I am apt therefore to imagine, that there is some Omission in this Place.

tinuance of which will presently remove all these Symptoms. But when the Wound is attended with great Inflammation and Fever, the Stiches should be somewhat loosened, the Patient should be let Blood, and live upon a thin Diet, and the Body should be kept open. These Symptoms being removed, the Stiches should be again tightened by degrees and the Wound dressed as above. But if these Applications should prove fruitless, and the Complaints should increase, so as to threaten Danger, the Stiches must be cut, and the Wound treated as if there was a loss of Substance, which Method we shall explain below.

What is to
be done after
the Wound
is healed.

XLIX. On the other hand, if the Wound heals by the Assistance of the Suture, which you will be sure of, not only from observing the Lips of the Wound to lie close together and unite, but by the Relaxation of the Threads or Ligature upon the disordered Part; the Threads or Ligatures are to be cut near the Knots with Scissors, the lower Lip of the Wound is to be suspended with one hand, whilst the Threads are gently drawn out with the other. The Punctures that are left will easily heal by the Application of a vulnerary Water, called by the French *l'Eau d'Arquebusade*, or by injecting *Aqua Calcis*, or *Spiritus Vini*, and laying on Compresses dipped in the same Liquors. But larger Wounds are to be dressed with one of the beforementioned Balsams, and the Lips kept firm together with some sticking Plaster, till a firm Cicatrix is formed.

Of healing
Wounds
where there
is loss of
Substance.

L. Where there is loss of Substance, the Wound will not unite either by the help of Plasters or Suture, till it is filled up with new Flesh. For this Purpose you will find Lint dipt in Oil, or spread with some vulnerary Ointment or Balsam, and applied to the bottom of the Wound, very serviceable, covering it with a Plaster, Compress, and proper Bandages. This Dressing is to be repeated daily: though it is a very vulgar Error, to suppose that these Applications generate Flesh, which is produced by the circulating Fluids, that in a wonderful Manner are continually bringing something new to the wounded Parts. Yet it must be owned that Medicines of this sort conduce very much to the Generation of the Flesh, and to remove every thing that might hinder that End; therefore it is no wonder they are called *sarcotic Medicines*. There ought to be a balsamic and emollient Quality in these Medicines, that they may not only resist Putrefaction, but may also soften the young Flesh, so that it may easily receive Additions from the Blood, and suffer itself to be elongated. Of this kind are the Oils, Balsams, and Ointments, which we took Notice of at N. XXXV, and XXIX.

How the Air
is to be
kept from
Wounds.

LI. As hot or cold Air is very hurtful to Wounds, so it must by all Means be kept from them, for nothing will sooner corrupt the Juices, or shorten and dry up the vessels, and hinder the growth of new Flesh, than the Air. In order to prevent Inconveniencies from this Cause, the Surgeon should be careful not to remove the old Dressings till the fresh ones are got ready, and to be as expeditious as possible in applying them. Then the Wound must be filled up with Lint, dipped in Oil, or some emollient Balsam; to this must succeed some vulnerary Plaster, a Compress upon the Plaster, and last of all a Bandage, to bind and secure the whole.

How the
Wound
should be en-
tirely healed.

LII. After this, when a white, even, thick Matter appears in the Wound, the Wound should be dressed as you shall see occasion; every Day, or every other Day, the superfluous Matter should be wiped away with a very light hand, and

and it is better to leave some behind than to treat the Wound roughly. For wiping the Wound roughly hinders the Growth of new Flesh: but a little Matter being left, performs the Office of Oil or Balsam, keeping the Parts moist. These Rules being observed, new Flesh will presently spring up, and the Wound unite.

LIII. But that nothing may be omitted which may seem necessary towards the perfect Cure of the Wound, the Surgeon ought to be industrious to procure an even Cicatrix. To this End it will be proper to dry by degrees, and to harden the Surface of the new Flesh, by the Application of dry Lint, covered with a tight Compress and Bandage. But when this is not sufficient, through a great Redundancy of Humours, it may be proper to use some of the drying Essences, or native Balsams at N. XXXIX, or drying Powders, such as *Tulia*, *Lapis Calaminaris*, *Masticbis*, or *Colephonium*. Rectified Spirit of Wine is frequently used for this Purpose with great Advantage, which carries a great astringent and drying Virtue with it.

How a Cicatrix is to be formed.

LIV. When you perceive any Uncleaness or Foulness in a Wound; that is, if the Flesh is putrid, fungous, black, pale, or livid, it must be well cleansed before you attempt to heal. Different Methods have been proposed to execute this Intention; the Antients used Honey in this Case, See *CELSUS*, Lib. V. Cap. 26. N. 22. But the Moderns apply a digestive Ointment, made *ex Terebinthinâ Vitell. Ov. q. f. subactâ cum Mell. Rosar. q. v. admist.* But where this is not strong enough for their Purpose, they substitute *Unguentum Egyptiacum*, vel *Vini Spiritu dilutum*, vel *digestivo admistum*. Some in the room of this use *Unguentum Fuscum Wurtzii*. To these digestive Ointments you may very properly add a small Quantity of *Aloës* or *Myrrh*, or, if you require still more Strength, *Mercurius precipitatus ruber*. But the use of *Aqua Calcis* is well known to be very beneficial as a Detergent, especially if you add to a Pint of this *Mercurii sublimati gr. xx. vel xxx.* which from its known efficacy for this Intention, is called by the Surgeons *Aqua Phagædenica*. Applications of this kind are to be continued till the Wound is entirely clean; and then you are to have recourse to the vulnerary Balsams, and the Method prescribed at N. L.

How foul Wounds are to be treated.

LV. If the new Flesh should be luxuriant, and rise up so as to prevent the Formation of an even Cicatrix, it must be taken down by the *Vitriolum Cæruleum*; or in the room of this you may use a Powder composed *ex Alumine usto, Mercurioque rubro precipitato*; at the same time making a proper Pressure with the Plaisters, Compresses, and Bandages, till the Parts are even.

How fungous Flesh is to be taken down.

LVI. The Patient should particularly observe a strict Regimen, with regard to his Diet and manner of Living; that by avoiding every thing, that produce Crudities or Acrimony, the Blood may be rendered pure and uncorrupted. For nothing forwards the Cure so much as a good Habit of Body; which may be procured by observing a strict Regularity with regard to Diet, consulting which is the most proper Air to live in, keeping the Passions under, and neither indulging in too much Sleep, nor suffering too great Watchfulness. The greater Tendency there is in a Patient to a diseased State of Body, so much the stricter Course of Life ought he to observe.

Rules to be observed by the Patient.

LVII. As to the Air, it ought to be temperate, and the Chamber should be equally guarded from Excesses either of Heat or Cold; for this Regulation is of Consequence in all Wounds, but most wonderfully so in those of the Head.

What Air is best.

If

If the Patient is in any Danger of suffering from the Dampness of his Situation, it will be very proper to burn Amber, Frankincense, and Mastich round him, to dry the Chamber. If he is in Danger from the Heat of his Situation, the Floor should be frequently sprinkled with Water.

What Diet
is best.

LVIII. All Intemperance in Eating and Drinking is most diligently to be avoided. That sort of Food is best which is most readily digested, for it makes a thin light Chyle and good Blood, which wonderfully assists the Wound in healing. For this Intention various sorts of Broths may be recommended to the Patient, particularly those that are made *ex Hordeo, Avenâ, Mannâ, Oryzâ, Scorzonera, Lactucâ, Endiviâ, Chærophyllo, Petroselino, Cichorio, Asparago*. He may eat Veal or Lamb, Pullets or Capons, Ale thickened with the Yolks of Eggs, ripe Fruits, particularly Apples, Cherries, or Plumbs; Vegetables also of several sorts well boiled, to wit, *Spinachia, Lupulus, Asparagi, Cinaræ, Lactuce*, and most Pot-herbs. But Persons of strong athletic Constitutions, that cannot be satisfied with Diet of this kind, may be indulged in a more nourishing one, if they are attended with no violent Symptoms: But wherever there is any degree of Inflammation, the Patient must entirely abstain from Flesh, and all solid Food. Wounded Persons should constantly avoid admitting any thing *sharp, salt, or spicy* into their Diet: For they give a Sharpness to the Blood, and increase its Heat and Motion, and consequently occasion Hæmorrhages, Fevers, and Inflammations. They should therefore abstain, especially if they are of a hot Constitution, from every thing that is seasoned, from Mustard, Horseradish, and Onions. *All Meats that are difficult to digest, and breed a thick Blood*, should also be denied; such are all fat Meats, Lard, Bacon, Geese, Beef, either salted or cured, in the Smoke, Peas, Beans, and Lentils, especially after they are dried, and all things of this kind.

What Drink
is best.

LIX. The Patient's *common Drink* should never be strong: Therefore he should be forbid the use of Wine, Spirituous Liquors, Mead, Strong Beer, &c. The smaller his Drink is, by so much is it the wholesomer. But in this Case we must always have a regard to the Constitution and Custom of the Patient, and the Nature of the Wound. If he has been used to drink Water, he may go on in the constant use of it, or drink in its stead a Decoction of Bread or Barley mixed with Liquorice, Aniseed, Fennel, or Citron Peel. Those who dislike Water may be indulged in good Small Beer, that is neither too new nor too stale: But if the Patient is in great Danger, and of a weak Habit of Body, you may prescribe him a particular *vulnerary Drink*, to correct the vitiated Fluids: But of these we shall treat more largely below, at N. LXIII, and LXIV.

Of Rest,
Motion,
Watchful-
ness, and
Sleep.

LX. The best Remedy for a wounded Person is *Rest*. Therefore he should be indulged in it, especially with regard to the lower Limbs: For to walk, or even to move, is very pernicious. There are many Instances of wounded Persons who have not only suffered grievous Injuries, but even Death itself, by violent Motions of the Body. Nor is too great Watchfulness of less Consequence to the Patient: Therefore if Nature denies necessary Rest, it must be procured by the Assistance of Medicines. To answer this Intention you may very properly prescribe *Syrupi Papaveris albi ℥i s ad ℥i ex Aq. Primulæ veris, vel Ceraforum nigror. vel ex Emulsione Papaveris Semine, & Amygdalis dulcibus confecta*. When this appears to be too weak for the desired End, you may give *Theriaca Venet.*

Venet. vel Confectio Mithridatii ad ʒi. vel ʒiii. vel Opii puri gr. i. in one of the Vehicles we mentioned above.

LXI. *The Bowels should by all Means be kept open*, especially in those who have received a Wound in the Head, for they are subject to great Heat of Body, and are very apt to be bound. But observe in this Place, that strong cathartic Medicines are to be avoided, for in so weak a State of Health they are of very ill Consequence. But it is not only safe, but adviseable to eat and drink those things, that may at the same time nourish and keep open the Body. To this End the Patient may drink plentifully of *Tea* or *Coffee*, or may eat stewed Prunes; roasted Apples also and Raisins may be eaten for the same Purpose: but hard Meats of all kinds are to be forbid. Where the Patient is so bound up, that a Diet of this kind has no Effect upon him, it will be necessary to have recourse to Medicines, but to those of the mildest kind: you may here give a gentle Clyster, or use a Suppository, or prescribe a Solution of an Ounce or two of *Manna*, or *some purging Salts*, in warm Broth, or a Draught composed of Tamarinds, Sena and Manna. But you must carefully avoid all resinous and heating Medicines.

The Bowels
should be
kept open.

LXII. *Violent Passions of the Mind*; such as Anger, Fear, Sorrow, Pensiveness, and particularly Lust, should diligently be avoided; and a quiet, serene, easy, chearful State of Mind preserved; the contrary of which will never fail to bring on dangerous Symptoms.

The Mind
should be free
from Care.

LXIII. Whenever the Violence of the Wound, or the ill Habit of the Patient, require the use of *internal Remedies*, vulnerary Drinks will be found to be of the greatest Consequence in this place; in composing of which, the Constitution of the Patient, and the Nature of the Complaint should be diligently consulted: For they are in a great Error, who, according to the Custom of common Surgeons, give one kind of vulnerary Potion for all sorts of Wounds, and in all Habits of Body. For if your Patient is of a phlegmatic Habit of Body, cold, pale, naturally subject to Tumors, then the vulnerary Decoction should be composed of Herbs that will attenuate and divide the Blood; such as the *Radices quinque aperientes*, *Rad. Caryophyllat. Fœnicul. Gramin. &c. Herb. Sanicul. Alchymyll. Agrimon. Bettonic. Veronic. Philofellæ, Pervinc. Virgæ Aureæ, Sophiæ Chirurgorum, Semen Anisi, Fœnicul. Dauci, &c.* The Drink is prescribed in the following Manner: Take two or three Handfuls of any of the before-mentioned Ingredients, boil them gently for a few Moments in six Pints of Water, strain it, and sweeten it with some proper Syrup, such as the *Syrupus Tonic. Betonic. Capill. Ven. Rad. quinque Aperient. De Cinnam. &c.* Give a Draught of this three or four times in a Day. You may also give Infusions of the same Herbs, and made after the manner of Tea, sweetened with Sugar.

What inter-
nal Medi-
cines are to
be given.

LXIV. Some Persons have a thin, sharp Blood; in this Case it will be proper to advise Decoctions of viscous glutinous Plants; such as the *Rad. Symphyt. Liquirit. Polypod. Scorzonæ. Sarsaparill. ; Herb. Malv. Althææ. Verbasc. Parietar. Mercurial. ; Flor. Malv. Althææ, Verbasc. Dactyli, Ficus, Jujubæ*; which may be prepared in the Manner we have just described, with the Addition of some of the *Syrup. Alth. vel de Symphyt. Liquiritiæ, vel Papaveris*, to give it an agreeable Taste, if the Patient have no Aversion to Sweetens. But if he is afflicted with great Pain or Wakefulness, then, besides the Methods which we lay down at Chap. II, too alleviate Pain, you may give an Ounce or two of the

Vulnerary
Drinks for a
thin, sharp
Blood.

Syrupus

Remedies a-
gainst Acri-
mony and
Heat.

Syrupus Papaveris albi vel de Meconio, mixed with the beforementioned vulnerary Drink, or with Emulsions *ex Amygdalis & papavere albo*.

LXV. If the Patient should be troubled with any Acidity, you may give him Powders every Day *ex Lapid. Cancrorum, vel ex Matre Perlarum, vel ex Conchis præparatis*, or any other Absorbents. But when you perceive a Quickness of Pulse, and an extraordinary Heat, they are sure Signs of a Symptomatical Fever: To relieve or take off which, the following Remedies will be found of Service. Give Barley Water with the Addition of some Tamarinds, and *Syrupus Mali Citrei vel Ribesiorum*; or some of the Powders mentioned above, saturated with Citron Juice, with the Addition of a small Quantity of Nitre. But in this Place it will be very proper for the Patient to lose some Blood, more particularly if he is young and full of Blood, or if the Pulse is strong and hard. In these Circumstances a *Physician* is more proper to be consulted than a *Surgeon*. But if the Patient is robust, and of a sound Habit, the best common Drink that can be prescribed, is Barley Water, or good Small Beer. What has here been said with regard to the Regimen to be observed by the Patient, as well with Respect to Diet as Medicine, I think is sufficient; and I heartily recommend the Observance of these Rules to all wounded Persons, but more particularly to those who are to undergo severe Operations in Surgery; such as Trepanning, Lithotomy, Extirpation of the Breast, Amputation of a Limb, or large Tumors. Whenever we shall have Occasion below to speak of the Regularity that Patients ought to observe in their Diet, I hope the Reader will endeavour to recollect what has been said upon that Head, that we may not be obliged to make tedious Repetitions.

CHAP. II.

Of the Disorders accompanying WOUNDS, commonly called the SYMPTOMS of WOUNDS.

I. Of an HÆMORRHAGE.

An Hæmor-
rhage how to
be stopped.

I. PROFUSIONS of Blood attending Wounds, all arise from Injuries of the Veins or Arteries. The Violence of the Hæmorrhage will be in Proportion to the Size of the wounded Vessel. Whoever considers this, will no longer wonder at the dreadful Consequences attending this Symptom, unless there be immediate Assistance; such as great Weakness, fainting Fits, and sometimes instant Death. No Surgeon therefore ought to be without a present Remedy to stop Blood. Though there are some Cases where it is by no means proper to restrain the Hæmorrhage instantly: For in a young, plethoric Habit, or where the Wound has been received in a drunken Fit, or in a Fit of Passion, it is best to let the Blood run, as long as it continues to do so without bringing on any Inconvenience upon the Patient: For by a moderate Loss of Blood, the Inflammation, Tumor, Pain, and Fever are prevented, or much lessened.

I. By dry
Lint.

II. There are various Methods proposed to stop an Hæmorrhage. If none of the larger Vessels are wounded, you have your Remedy at hand, to wit,
dry

dry Lint, which you are to fill the Wound with pretty closely, covering it over with large Compresses, and making a proper Degree of Pressure over all with Bandages, and with your Hands: For more Service is frequently done in this Case by making a proper Pressure upon the Part with the Dressings, and with your Hands, than could be effected with more violent Remedies. But you must avoid too strict a Pressure; which often produces violent Pains, Inflammation, and at last even a Gangrene.

III. But if the Hæmorrhage is too large to be stopped by the Application of dry Lint, then *astringent Medicines* are to be called into Use. With this Intention the Ancients applied Rags to the Wound, which were dipped in cold Water or Vinegar, and covered them with Compresses wet with the same Liquors. Amongst the Surgeons of later Date, a certain Fungus called *Lycoperdon*, or vulgarly *Lupi Crepitus*, has been highly extolled for this Purpose: The Wound is filled with this in the room of dry Lint, and afterwards dressed up in the same manner as we directed above. The most common Remedy at present is *Spirit of Wine highly rectified*; this is applied cold to the Wound, filling it up with Dossils dipped in the same Spirit, and covering it with large Compresses wrung out of the same Liquor, making a proper Pressure over all with the Bandage. The same Virtues used to be ascribed to *Oil and Spirit of Turpentine*, applied in the same Manner as the Spirit of Wine. To this End also strong Solutions of *Alum, Vitriol, or Saccharum Saturni in Aquâ Plantaginis*, were recommended by many. Some dissolved Alum and the Vitriol together in the same Water, or, where they would have it of more Force, in Phlegm of Vitriol. Others make a styptic Liquor *ex Vitriol. Alb. ʒi, & Aceti fortissimi ʒiii*, applying it in the foregoing Manner. In this Place we are by no means to omit the Mention of *astringent Powders*: such as are made *ex Bolo Armeni, Lapide Hæmatite, Sanguine Draconis, Croco Martis astringente, Terrâ Japonicâ, Aloë, Olibano, Mastiche, Granat. Corticibus, Alumine, Saccharo Saturni, Terrâ Vitrioli dulci, Gipso, Hepate, Vitulino tosto*, and several other Medicines of this Kind, either alone or mixed in different Proportions, and sprinkled plentifully upon the Wounds, dressing them up with Lint, Compresses, and Bandages, as above.

IV. When Vessels of a larger Size are divided, it is usual to apply *caustic Medicines*, which act by their great Astringency. The Medicine chiefly used with this Intention, and indeed the safest, is *Vitriolum Romanum*, which being coarsely powdered and sprinkled upon Cotton, is easily applied to the Wound, dressing up with Dossils, Compresses, and Bandage. The *Liquor Stypticus Weberi* is also used here, and others of the like Kind, which have Oil of Vitriol in their Composition: But those Dressings only which are applied to the Bottom of the Wound are to convey these Medicines, otherwise the neighbouring Parts would suffer too great Corrosion. Those Medicines which are ended with a stronger caustic Quality than these, such as *Mercurius Sublimatus, Lapis Causticus, Oleum Vitrioli, &c.* can never be used with Safety, because they are constantly attended with violent Symptoms, from their too corrosive Faculty.

V. But if these Applications prove fruitless, it will be proper to *divide entirely the Arteries which are only divided in part*, and occasion the Hæmorrhage: For by this means they will contract and hide themselves under the muscular Flesh, and the Orifices will be choaked up; at least they will more readily

H

yield

2. By astringent Medicines.

3. By caustic Medicines.

4. By dividing the Arteries.

yield to the Force of the Medicines recited above. This Method of Treatment is principally necessary in Wounds of the temporal Arteries, and of those of the Cubits and Tibiæ.

5. By the
actual Cau-
tery.

VI. If this Method should also fail, you must have Recourse to the *actual Cautery*. The Orifices of the Vessels being burned, a Crust is formed over them, and this Method is so effectual, that it is scarce possible for an Hæmorrhage to happen in Wounds of the external Parts, but what may be stopped by it. You should in this Case always have two Cauteries ready, that if one should be extinguished before the Operation is finished, you may be prepared with another. Cauteries are made of very different Shapes and Sizes, according to the Parts to which they are to be applied: I have given you eight different Sorts, for different Uses, in *Plate III, Fig. 9 to 16*. There are two Inconveniencies which generally attend the Use of the Cautery, and sometimes force us to neglect it. For first, not only the Patient is wonderfully terrified at the Apprehension of it, but Mankind in general look upon it as a Piece of Barbarity to advise the Use of it: When, to say the Truth, it does not occasion such violent Pains as are usually apprehended from it; and what Pain there is in the Operation, is instantly over. But it is also attended with another Inconvenience of greater Consequence; that is, the Eschar, which is brought on by the Cautery, frequently falls off in two or three Days, especially in the larger Arteries, from whence a fresh Hæmorrhage succeeds, and most likely a deadly one. To prevent this, two things are to be observed: First to handle the Wounds tenderly at the Time of dressing; and secondly, to be provided always with a fresh Cautery, to repeat the Operation if necessary. This Caution is to be observed in the larger Arteries for fourteen Days: After this there is no greater Danger of a Return of the Complaint. But where the crural or axillary Arteries are wounded, the Cautery will be of no Service.

6. By Liga-
ture.

VII. In very dangerous Wounds of the large Arteries, such as the crural and axillary, and in Amputations of the Limbs, the safest Method is that of making a *Ligature* round the Vessels. If this is performed by passing a strong waxed Thread under the Artery by the Help of a crooked Needle, the Blood is presently stopped, and the Orifices of the Artery coalesce. Or it is sometimes taken up with a Forceps, the Thread wound round it, and the Artery is compressed.

7. By In-
struments.

VIII. Lastly, several Instruments have been contrived to stop Hæmorrhages in different Parts of the Body. Formerly a large Iron Ring, furnished with a Screw, was in great Use amongst the Surgeons; which they applied in such a manner to the wounded Limbs, that by tightening the Screw which pressed upon the Compresses, and other Dressings, it closed the Mouths of the Vessels, and stopped the Flux of Blood. You may see Descriptions of this Instrument in *SCULTETUS*. But as this was a very inconvenient Instrument, and could only be applied to the Limbs, the Surgeons found themselves under a Necessity of inventing a more convenient Instrument, that might be applicable also to the Arteries of the Neck or Head. An Instrument of this Kind you may see in *Plate V, at Fig 2.* the Construction of which is as follows: A Brass Plate of three Fingers in Length, and two in Breadth, AA, is perforated in the Middle to admit a strong Screw, BB, which is provided at the lower End with a small round Plate, C: a Piece of Leather is strongly fastened to one End of the Brass Plate,

Plate, of equal Breadth with it, E E, F F. In violent Hæmorrhages this Instrument is fitted to the wounded Part, and the End F is, by Means of Holes that are made in it, fastened to the Hooks G G; so that the small Plate C may press exactly upon the Compresses and Dressings that cover the Wound. All things being thus prepared, the Handle of the Screw, D, is to be turned round gently till a sufficient Pressure is made to stop the Blood; and then it is to be left in that Condition for a Day or two. But it must be entirely left to the Discretion of the Surgeon, when he shall think it prudent to alter the Position, or entirely to take off the Instrument. An Instrument of this Kind, with a longer Belt, will serve in Wounds of the Head and Temples.

IX. When we are speaking of Instruments that are used to suppress Hæmorrhages, we must not omit the *Tournequet*, which we use with great Success after Amputations. There are several things required to form this properly. The first thing to be enquired after is a small Roller of a Thumb's Breadth, and about a *Paris* Ell in Length; in the next Place a little cylindrical Stick; then a conglomerated Bandage, two Fingers thick and four long; some Compresses of a good Length, and about three or four Fingers in Breadth, to surround the Legs or Arms. Lastly, a square Piece of strong Paper or Leather, about four Fingers wide.

X. We are now acquainted with the Nature of the *Tournequet*. It remains that we enquire which is the most convenient Manner of applying it. The rolled Bandage is to be applied to the Trunk of the wounded Artery lengthways, covering it in a contrary Direction with Compresses, surrounding the Leg, Foot, or Arm, as it were with a Ring. The Roller must be passed twice round these Applications, and fastened in a Knot, but so loosely, that you may easily introduce your Hand between it and the injured Part: The Leather or thick Paper must be nicely placed under it upon the external Part of the Leg, or Arm, and the Roller tightened by Degrees, by turning the Stick round, (which is to be introduced into the Knot) till the Hæmorrhage is entirely stopped. The Stick must be kept in this Situation till the Wound is properly treated, and the Return of the Hæmorrhage prevented by proper Remedies, or by taking off the Limb. When this End is acquired, the *Tournequet* is to be loosened, or entirely taken off, as the Surgeon shall think convenient. But where it is applied to the Arm, the rolled Bandage is to be placed near the *Axilla*, in the internal Part of the *Humerus*, and the Stick in this Case is to be fastened on the opposite Side; the Situation of the Artery requires this Position, See Plate III, Fig. 1, Letter K. When the Hæmorrhage happens in the Thigh, the Bandage is to be applied to the upper Part of the Thigh, or just over the Knee, as the Circumstances shall require, in the same Manner as before, See Lett. L, M, N. But that you may have a clearer Idea of the Figure and Position of the *Tournequet*, we have given you a Draught of it, at Plate III, Fig. 2.

XI. PETIT, a Surgeon of the first Rank in *Paris*, invented another *Tournequet* in the room of this, which is well enough known by the Name of the Inventor. It is said to have this Advantage over the other, that it will preserve its Situation without requiring the Attendance of an Assistant: And besides, that it may be left upon the Limb any given Time, without impeding the Circulation of the Blood: Whereas the common one entirely interrupts the Circulation of the Blood, and therefore cannot be kept on long. The Description that I have seen of it is so short and imperfect, especially as the Parts of which it is composed

are not described separately, that in many Places I could not understand it. GARENGEOT, *Tom. II. de Instrument. Chirurg.* differs a little in his Description of it, but he is by no means clear.

Our Improvement upon it.

XII. Therefore I have taken some Pains to correct it in the Manner you may see at *Plate V, Fig. 6*, A A describes the upper Part, B B the lower, and C the Screw; all in their natural Size, made of some strong Wood. At the Extremity D D there are two small Iron Screws, to which a strong Silk Roller is to be fixed, of the same width with the Instrument, but about twenty Fingers in length, that it may be long enough to encompass the largest Part of the Limbs, and be fastened at the small Hooks described at E. Both Extremities at F F are to be hollowed, that the Roller may lye quiet and firm. G describes an Iron Plate which is placed there to strengthen the Wood. The Wound therefore being properly dressed up, and the lower Part of the *Tournequet* guarded with a Bolster, is to be placed on the Side opposite the Wound; the Silk Roller is to be brought round the Limb, and being drawn very tight, is to be fixed to the Hooks E; and then by turning the Screw C, till a sufficient Pressure is made upon the Parts to stop the Flux of Blood, it must be left upon the Limb in this Situation, as long as the Surgeon shall deem it necessary. By means of this *Tournequet*, I have stopped an Hæmorrhage in a Wound of the crural Artery, and recovered the Patient without any Ligature or Amputation, in the presence of many Witnesses.

MORAND'S *Tournequet*.

XIII. GARENGEOT, in the second Edition of his Book of Chirurgical Instruments, describes another *Tournequet*, invented by MORAND of Paris, of which he has given us a *Plate at page 360*. This resembles the former in many Circumstances, but differs from it chiefly in this, that in the room of a simple Screw, MORAND has substituted a compound Screw, that takes Place sooner; this he makes always of Steel; and it acts more in one Turn than the other can in two or three. This you may see more largely described, if you consult the Author himself. But GARENGEOT makes some Exceptions to this Instrument, and prescribes PETIT'S.

Another.

XIV. Some Years since, when I attended the Army, I was called to an Officer of Rank, who was dangerously wounded. I saw there a kind of *Tournequet* made of Iron, and very heavy, that much resembled MORAND'S, but differed from it in some things, I do not know by whose Direction: But as I have never seen it described before, I have given you a *Plate of it, See Plate V, Fig. 7*. A is the lower Part pierced all round the Edges with several *Foramina*, by which means it will admit of a Bolster or Cushion to be sewed to it. B is an Iron Barrel to receive the Screw. C is the upper Part. D is another Barrel fixed upon that, for the Reception also of the Screw. E E are the Extremities of the upper Plate, one of which is supplied with small Hooks, the other with large Hooks, and with an Opening also to pass the Roller through and fasten it, almost in the manner we have described it in ours of *Fig. 2, and 6*. F is a kind of Ring, surrounding the Screw, above the upper Plate. G is a square Body made like a female Screw, for the Reception of the small Screw H, and the great Screw I K, which would otherwise fall down, but by this means is easily kept up in the Box D. L is an Iron Cylinder, which is firmly fixed in the lower Plate, but is loose in the upper: This keeps the two Plates in the same Situation with

with each other, and at the same time admits the upper Plate to slide up and down freely, as occasion shall require.

XV. I endeavoured to improve this Instrument, and ordered one to be made of Brass after the Manner described at *Plate VI, Fig. 1.* In this the upper Plate AA, is much shorter than the lower CC; the Belt DD, is fixed at one End, and after it has been brought round the Limb, is fastened to the other End by small Hooks EE. The Belt passes through the lower Plate at both Ends by Holes made for that Purpose FF. The Instrument is by this Contrivance always kept even, and does not change its Posture upon the Action of the Screw B. The Reader may chuse which of these Instruments he thinks fittest for his Purpose; they will all answer the Intention they were made for; one does it sooner, the other takes a little more time. But this Proverb will always have its force, *Sat citò, si sat benè.* How the *Tournequet* is to be applied in Amputations of the larger Limbs, we shall shew in the proper Place.

An Amendment of my own.

XVI. Before we take leave of this Article, it may be proper to inform you, that in Wounds of the large Arteries, *the internal use of astringent Medicines will be of no service*; besides, they frequently occasion Pain, Inflammation, Fever, and other Disorders, by making Obstructions in the Lacteals, Mesenteric Glands, and other Vessels; therefore it is best to lay them entirely aside.

What is to be done by internal Astringents.

II. *Of PAIN in WOUNDS.*

XVII. Pain may be reckoned amongst the most grievous Symptoms that usually attend Wounds: for great Watchfulness, Weakness, Convulsions, Inflammations, Gangrene, and even Death itself, arise frequently from this Cause. The Causes of Pain are many. 1. Sometimes an extraneous Body is left in the Wound, which occasions great Irritations, especially in nervous Parts of the Body. 2. Corrosive Medicines, which are sometimes applied to stop the Hæmorrhage. 3. Or a large Obstruction of the Blood may happen near the Wound, and bring on Tumor and Inflammation: This frequently happens in Plethoric Habits of Body, or in Gun-shot Wounds, because in these Wounds there is usually but a small Discharge of Blood. 4. Lastly, Wounds, or Tension of Nerves or Tendons may well be reckoned amongst the principal Causes of Pain.

Of Pain in Wounds.

XVIII. It will be well worth our while to consult the Cause of Pain, that we may remedy it with the greater Ease: For all Pain will not admit of the same Remedy. Therefore, 1. *If any extraneous Body is left in the Wound*, the first Intention is to remove it, in the manner we taught at N. XXXI, XXXII, XXXIII. 2. *If the Pain arises from the Application of any corrosive or astringent Medicine*, it must be removed, or at least moderated. This Intention will be answered by warm Milk, the Decoctions *ex Malvâ, Althæâ, Floribus Chamæmel. Sambuc. Melilot. Verbasc. Sem. Lin. Papav. &c.* The Wound should be cleansed with a Sponge expressed from Decoctions of this kind, till nothing corrosive remains in it, and till the Pain is removed. Cataplasms may be applied warm to the Wound, made of the foregoing Herbs. There are other Medicines also which Physicians prescribe to be given internally to assuage Pain, as anodyne Emulsions. 3. *When the Pain arises from the Violence of the Inflammation*, which is frequently the Case, it will be proper to bleed as largely as the Strength of the Patient will allow: but if you cannot draw a sufficient Quantity, you must scarify the Part, as near the Wound as is convenient, especially in Gun-shot Wounds.

Of Remedies for Pain.

By

By this Method the stagnating Blood is set at liberty, and the Inflammation and Pain are instantly relieved. In the mean time, you may foment the Wound *cum Oxycrato vel Spiritu Vini Camphorati*; or, which is much better, *cum Aquâ Calcis Vivæ modica portione Spiritus Vini Camphorati commist.* Emollient Cataplasms, and such Applications as we shall more largely treat of when we come to speak expressly of Inflammations, take place here. Absorbents should be taken inwardly, such as *Lapis Cancrorum*, *Conchæ præparatæ*, *Antimonium Diaphoreticum*, mixed with a moderate Proportion of *Nitre*. All things should be forbid that increase the Circulation. Lastly, 4. *Where the Pain arises from an Injury of the Tendon or Nerve*, the Cure is very difficult: For this Case is always attended with violent Inflammations and Convulsions. To prevent ill Consequences that may happen in Wounds of this kind, it will be proper to dress with *Balsam. Peruv. Balsam. Copaib. Ol. Terebinth. vel cum misturâ ex Ol. Terebinth. & Aq. Regin. Hungar. confect.* These Medicines should be moderately warmed before they are applied to the Wound, laying a Cataplasm over the Dressings, composed *ex Herb. Scord. Absinth. Abrotani, Flor. Sambuc. Chamamel. &c. Vin. q. s. decoctis.* Internal *antispasmodic* Medicines should by no means be neglected in this Case. If the Pain is not lessened by these Remedies, there is great Reason to despair, unless the wounded Part of the Nerve be instantly divided; for although this Method deprives all the Part of the Limb that lyes below the Division of the Nerve of Sense and Motion, yet in such a desperate Case it is better to lose the use of a Limb than Life itself.

III. Of SPASMS and CONVULSIONS.

Convulsions,
from
whence.

XIX. Spasms and Convulsions are brought on many ways: For they not only arise from all the Causes that occasion Pain, but frequently from too great loss of Blood. This appears from the many Examples of Men, and other Animals, that have died by the Violence of the Hæmorrhage. All these before they expire fall into strong Convulsions and Distensions of the Nerves. HIPPOCRATES mentions this as the worst of Prognostics, *Alph. 2. Sect. 5.* "Convulsions, succeeding a Wound, are mortal."

How Con-
vulsions are
to be cured.

XX. In order to remedy these Disorders, it is necessary first to discover their Cause. Whenever Convulsions are occasioned by extraneous Bodies, by corrosive Medicines, or by wounded Nerves, the same Methods are to be followed, which we advised for the Relief of Pain from the same Causes at N. XVIII. If they are occasioned by *Inflammation or Fullness of Blood*, Blood-letting will generally bring Relief, especially if we use at the same time the emollient Remedies advised at N. XVIII. If they are occasioned by *an immoderate loss of Blood*, Blood-letting is to be avoided, notwithstanding some amongst the *French* advise it in convulsive Disorders arising from what Cause soever, See GARENGEOT, in his *Chirurgie*, Chap. 2. In this Case it will be better, by the Methods before advised, to stop the Blood, and to give the Patient warm Broth, warm Milk, and Draughts of warm Ale thickened with Yolks of Eggs, and sweetened with Sugar; by this Method the Vessels are filled again by degrees, and the Cause ceasing, the Convulsions go off. In the mean time strengthening Medicines should by no means be neglected, particularly a Wine, Emulsions, and strengthening Drinks.

* See CELSUS, B. V. Ch. 26. N. 25.

IV. *Of the SYMPTOMATICAL FEVER.*

XXI. If the Patient has a quick Pulse, and an increased Heat, we say he has *a symptomatic Fever*. This Fever is of very dangerous Consequence, and will quickly prove mortal, if not timely relieved by the Assistance of the Physician. Symptomatic Fever, what.

XXII. In order to cure Fevers of this Sort, the Physician should forbid the Use of every thing, both in Medicine and Diet, that may encrease the Heat; and order small Liquors to be drank plentifully, such as Barley Water, thin Gruels, Ptisans, &c. cooling Powders mixed with Nitre and Camphire should be prescribed. The Bowels should be kept open with Clysters, if they do not answer naturally. Where the Patient has lost but a small quantity of Blood, and is of a plethoric Habit, it will be right to open a Vein on the opposite Side to the Part wounded. A very thin Diet is to be advised, as *Decoct. Hordei*, &c. and in small Quantities at a Time. Flesh, and all solid Diet and Spices, should be absolutely forbid. Cure of the Symptomatic Fever.

C H A P. III.

Of GUN-SHOT WOUNDS.

I. **G**UN-SHOT Wounds are attended with much worse Consequences than Wounds that are made by sharp Instruments: For, besides the Effusion of Blood, the Parts are more shattered and torn, especially when the Shot falls upon the Joints, Bones, or any considerable Part. Gun-shot Wounds.

II. The Antients were entirely unacquainted with Wounds of this sort, as they fought chiefly with sharp Weapons, as Swords and Spears; or with Clubs, &c. For the Use of Gun-powder was not known till about three Centuries ago. Although many of the Ancients make Mention of Bullets, and of their being used in Engagements, yet they had neither Guns nor Gun-powder: On which Account they could not drive them with such Force as the Moderns: For they either hurled them with a Sling, or shot them from a Cross-bow. Whether known to the Antients.

III. Wounds of this Kind have a Crust or Eschar formed upon them, and therefore are attended with little or no Hæmorrhage at first, unless some considerable Vessels are wounded. But as soon as the Eschar falls off, the Hæmorrhage is sometimes so violent as to endanger the Life of the Patient, unless a Surgeon is at hand. For the five or six first Days there is little or no Discharge of Matter: Therefore it is not to be admired at, if Gun-shot Wounds, while the Vessels are compressed by the Eschar, exceed all others in Violence of Symptoms, such as Inflammation, Pain, Gangrene, &c. Discharge small quantities of Blood and Matter.

IV. The Eschar which is formed upon these Wounds is not occasioned, as many have imagined, so much by the Heat of the Bullets, as by the Rapidity with which they destroy the Parts, and the Violence of the Symptoms is owing chiefly to this Rapidity, whence ensues a violent Contusion; and to the extravasated Blood being long confined under the Crust. Formerly they were of Opinion, that there was something poisonous in Wounds of this sort, but in this also they were mistaken, for nothing poisonous enters the Composition, either of the Powder or Ball. So far from it, that the Powder is used medicinally in acute Fevers.

How many
Differences.

V. Gun-shot Wounds are some of them deep; some shallow, which only affect as it were the Surface of the Body, and perhaps take off a Piece of Skin or the Fat at farthest: These are attended with less Danger, and generally with less Pain. In some the muscular Parts alone are wounded, in others the larger Veins and Arteries, which often discharge such a Quantity of Blood, as to endanger the Life of the Patient. Sometimes the Ball passes clear through; sometimes it remains fixed in the Wound, and frequently carries Part of the Cloaths or Wadding with it. From the Difference of these Circumstances different Symptoms arise. In others, again, the Bones are injured either by Collision or Fracture; and that sometimes in the Body of the Bone, sometimes in the Extremes or Joints. Whence commonly arise the worst of Symptoms; and the Patient fares well, if he loses only the Limb, and not his Life into the Bargain, especially if the Joints of the Tarsus, Cubitus, Knee, Shoulder, or Thigh be violently shattered; unless the wounded Part, which is indeed almost the only Remedy, be cut off in Time. Gun-shot Wounds, which happen to the Viscera, or the Contents of the Head, the Thorax or the Abdomen, as they fall on the nobler Parts of the animal *Œconomy*, generally end in Death, if not instantly fatal.

Of Wounds
in the Cranium.

VI. Gun-shot Wounds, which affect the Cranium or Skull and the temporal Muscles, are for the most part attended with great Danger: For even those, that appear very slight externally, frequently bring on terrible Symptoms, by the Concussion of the internal Parts which they occasion. For dangerous Fissures are often produced; of worse Consequence than even Fractures themselves: Because by this means the internal Laminæ of the Cranium are shattered; or the Veins and Arteries of the Brain burst, in which Case the extravasated Blood has no Vent, nor can the Splinters of the Cranium be extracted. Death therefore must be the Issue, unless prevented by the Trepan. If the Ball is lodged in the Brain, the Patients almost universally die: But, if it has pierced only one Side of the Brain, they may recover; which has been seen in Practice by myself and others. Yet all Injuries whatever of the Cranium and the temporal Muscles, are attended with great Danger, on Account of the Nerves and Arteries in those Parts, and are therefore to be treated with great Care and Circumspection.

Of Wounds
in the Thorax and Abdomen.

VII. In the Thorax, if the Heart, or its Auricles, &c. if the pulmonary Artery or the Aorta, the Trunk of the Vena Cava or the pulmonary Vein, or any of their larger Vessels are burst, they are generally mortal. But if no large Vessel is wounded, you need not despair of a Cure; though the Patient is often troubled with a Difficulty of Breathing. If any Viscus of the Abdomen is pierced by a Ball, as the Ventricle, Intestines, Liver, Spleen, &c. or any large Blood-vessel, in its Contents, Death must be expected. But if the Liver, Spleen or Kidneys are only superficially wounded, the Patient frequently recovers. So, if the Bladder should be injured in the Part situated without the Peritonæum, these Wounds are generally healed. But, if the Ball rest in the Bladder, it occasions such an Accretion of calculous Matter, that the Patient cannot be cured without cutting.

Cure of
Gun-shot
Wounds.

VIII. In the Cure of these Wounds, the Surgeon must in the first Place examine, whether the Wound be slight, or of a dangerous Kind. We term it slight, if the external Parts only are hurt, such as the common Integuments, or part only of a Muscle, wherever situated; if the Bones are not affected, and if
it

it be pervious. In these Cases, if there be no Hæmorrhage, the Crust is to be removed by Suppuration. To effect this, the best Method is, first to dress the Wound with soft Lint and a Compress; the second or third Day to fill it up gently with a digestive Ointment, or with Honey, as a most excellent Suppurative; then cover it with a Plaster and Compress, or a Compress alone; and lastly, to secure it with a Bandage. If such a Wound should be received in a Part, where Compresses and Bandages cannot conveniently be applied (as for Instance, on the Face) it will be sufficient to secure the Lint with a Plaster only. Let this Dressing be continued either every, or every other Day, till the Crust is separated, the Wound cleansed and incarned; and the Cicatrix will be happily formed by the Application of dry Lint.

IX. When the Crust is removed, they generally apply balsamic Medicines; as all native Balsams, or Oil of Turpentine, or the *Eau d'Arquebuse*, which Method we by no Means disapprove; though indeed Wounds of this Kind are easier healed by being left to Nature, especially in sound and robust Constitutions. If any of the soft Parts are taken off by a large Ball in the Surface of the Thigh, Calf, Side, or Arm, the same Method of Cure is to be followed. If the Suppuration be too abundant, or the Flesh luxuriant, these Mischiefs must be removed by burnt Allum and red Precipitate; and the Wound must be dressed with Oil of Turpentine, *Bals. Copaiv.* or some balsamic Essence, as Amber, Myrrh, &c. or sometimes with dry Lint only. There are Cases, where the proud Flesh may be removed with the Finger. But in larger Wounds, when the Crust is cleared, you should avoid digestive Medicines, and apply nothing but spirituous Balsamics. What further to be done.

X. If there happen in these Cases a violent Contusion or Inflammation, there is no better Method (especially if the Patient has lost little or no Blood by the Accident, and is of a plethoric Habit) than to make a wide and deep Incision in the Wound, the Neck only excepted, on Account of the large Vessels. After a sufficient Discharge of Blood, the Incision should be dressed with fine dry Lint, Compresses well saturated with warm Spirit of Wine, and a proper Bandage. If there has not been a sufficient Discharge, Venesection must be applied in plethoric Constitutions. Inflammation.

XI. But if a Hæmorrhage arise from a Wound in the fleshy Parts, it is a certain Sign that some large Vein or Artery is injured; for the small Vessels seldom bleed. In this Case styptic and balsamic Medicines, nay, the *Alcohol Vini* is always prejudicial; for they constrain the bruised Parts, check the Circulation, and of consequence either cause an Inflammation, or increase it; and too commonly pave the Way to a Gangrene and Mortification. Or, if Styptics should perhaps be particularly necessary, I would advise the *Nodus ex Vitriolo*, or a small Compress dipped in the Styptic of WEBER or RABELIUS to be applied only to the Lips of the wounded Vessel, and pressed down with the Finger, till it produces a Scar, and the Blood is stanch'd. For these Wounds will bear the Application of much Lint, or the Stricture of Bandages. But the best and safest Way, is to close up the Mouth of the wounded Vessel with a Needle and Thread. Hæmorrhage.

XII. In Wounds of the large Arteries (the Situation of which the skilful Anatomist is not unacquainted with) that the Patient may not be lost by a violent Hæmorrhage, it is expedient, first to compress the Artery with your Thumb, Of Wounds in the large Arteries.

then apply the *Tournequet* to the wounded Limb, and by constringing the Trunk of the Vessel, stop the Discharge: After this, you must take it up by means of the crooked Needle (*See Ch. II, N^o. VII.*) But, if from the Narrowness of the Wound you cannot get at the injured Vessel, it must be enlarged with the Scalpel, in order to reach the Artery and bind it up, or stop the Hæmorrhage by the Application of Styptics. The Wound should afterwards be dressed with dry Lint, Compresses, and a Bandage. Nor should these Dressings be renewed till the third or fourth Day, nor the Lint be removed for Fear of a fresh Hæmorrhage; but let it remain, till it quits of its own accord.

Gun-shot
Wounds of
worse Con-
sequence.

XIII. But there are Gun-shot Wounds of worse Consequence than these. To which Class may be referred, 1. Those where the Balls have not passed through; or where they, and other Bodies forced in with them, remain in the Part. 2. Where the Bones are at the same Time broken or shattered. And, lastly, where the Viscera, and larger Vessels, or within or without their Cavities, are wounded; from whence arise very dangerous Hæmorrhages.

The general
Method of
treating these
Wounds.

XIV. In the Treatment of these Wounds we must have Regard both to the Wounds themselves, and the Accidents attending them. As to the Wounds themselves, six Particulars are to be observed. As (1) If we perceive that the Ball has not passed through, which is plainly demonstrated by a single Aperture; in this Case we must endeavour with all Speed to extract the Ball, or other foreign Bodies forced in with it, such as Cloaths, Wadding, &c. The same also is to be regarded with respect to Splinters of Bones: For, before these are removed, you in vain attempt to heal. (2) If there be a violent Hæmorrhage, it must be stopped by the Method abovementioned; but if it be slight, and from the smaller Vessels, it is scarce worth attending to. For in the first Place it is often serviceable in plethoric Habits, by lessening the Quantity of Blood, and thereby preventing Tumors and violent Inflammations; and it generally stops of its own accord; or is easily checked by applying dry Lint or a gentle Astringent. (3) Bruised and corrupted Flesh sticking in and about the Wound (which is called a Crust or *Eschar*, if but a little) is easily taken off by a digestive Ointment, and Spirit of Wine, impregnated with *Sal Ammoniac*: If much, it cannot be removed without deep Scarifications and suppurating Medicines. (4) The Void of the Wound must be filled up with new Flesh: (5) An even Cicatrix be formed: And (6) If any Bones are broken, they must be united.

Extraction
of Balls and
extraneous
Bodies.

XV. With regard to the Extracting of Balls or other foreign Bodies, the Surgeon should immediately enquire, except there be a violent Hæmorrhage, if any thing of that Kind remain in the Wound, and where. But here we must observe, that Balls, Stones, and other hard Bodies are easier discovered by the Finger, or Probe, than Fragments, or Cloaths, or Wadding: For these last, from their Softness, and the Redness occasioned by the Blood, are very difficult to be distinguished from the membranous and muscular Parts, either by the Sight or Touch. But, to be surer in this Case, it is always useful, nay, generally necessary, to enlarge the Wound, and scarify; carefully avoiding the larger Veins and Arteries, but not regarding the smaller, the Nerves, or the Muscles. This you must do, till you come at the foreign Bodies: The Extraction of which should be performed, if possible, with the Hand; or, if that cannot be done, with a Forceps, or Hook, *See Plate III, Fig. 3, 4, 5, 6, 7, 8.* They are easiest removed at first: For after some Delay the Tumor and Inflammation of the

Parts

Parts render it difficult and painful. Besides, Bullets will by Degrees work themselves deeper, and be buried under the Muscles: Which will occasion Fistulæ, Rigidity of the Limbs, and other Inconveniencies. In extracting Balls that lie deep, you must take great Care not to lay hold of Blood-veffels, Nerves, or Tendons; which Accident will be avoided by introducing the Forceps shut, and not opening them till you feel the Ball.

XVI. When a Bullet is lodged in a Bone, we must endeavour to extract with the Forceps or Hooks, (*See Plate III, Fig. 8.*) If it lie too deep for these, we must have recourse to the Trepan, as described *Plane III, Fig. 7.* or *Plate VII, Fig. 7. Lett. B.* But if this will not avail, LE DRAN advises immediate Amputation. Yet in my Opinion, unless in Cases of great Extremity, we had better leave the Ball, till the Parts suppurate, and set it at Liberty. Sometimes the Ball is removed by trepanning: Sometimes it remains a long while in the Bone without any Danger or Inconvenience: A remarkable Instance of which, I remember in an Officer, who for many Years carried a Bullet in the Middle of the Tibia, that gave him no Trouble. Whence it appears, that we should not be too hasty in proceeding to Amputation. But if a Ball, or any other extraneous Body, be lodged in the Joint between two Bones, CELSUS (*Book VII, Ch. 5.*) has very judiciously advised, to extend the Joint with your Hands, or by the Means of Bandages and Slings, as in the Case of Luxations: By which the Ligaments being loosened, Room is made between the Bones, for the easier Extraction of the foreign Body. I have often wondered that this excellent Precept of that great Physician should be so generally neglected by the Moderns, as a thing of no Consequence.

Of Balls in the Bones or Joints.

XVII. Whenever the Ball has penetrated so deep into the wounded Part, as particularly in the Arm, Thigh, Thorax, or Abdomen, that you can easily feel it with your Finger on the Side opposite to the Wound, the Surgeon should examine nicely whether it is safest to bring it back by the way it went in, or to make an Opening upon it, and draw it out at the opposite Side. When the Wound cannot be enlarged without Danger of injuring the neighbouring Parts, you should search for it with the Probe; and endeavour, but with great Caution, to extract with the Forceps, or some other convenient Instrument.

Of Extraction on the opposite Side.

XVIII. If the Wound is attended with fractured Bones, after the necessary Incisions have been made, what Fragments are loose, whether in the Cranium or elsewhere, should be gently removed. If these Fragments should adhere to the principal Bone by their fine Membranes, they must be cut off; and the larger Parts of the Bone, that are not much injured, be reduced to their natural Position, and retained there by proper Dressings, as in other Fractures. Where any Splinters stick out, which hinder the Reduction, and hurt the neighbouring Part, you should break them off with the Forceps. If the Bones of the Tibia or Femur are broken, after they have been cleared of the extraneous Bodies, and reunitd in the best Manner, they are to be dressed with the eighteen-headed Bandage, and repofed in the Straw-couch, (*Fr. Fanones*) or in PETIT's Machine, as in other complicated Fractures. Where a Wound is inflicted by a spent Bullet, or the Fragment of a Grenade, and the outward Integuments are not penetrated, though the Bone be broken; in this Case worse Consequences are to be expected from the Violence of the Contusion. Therefore, to free a Passage for the extravasated Blood, we must make deep Incisions in the Integuments and

Of the Cure of fractured Bones.

Muscles, but not quite to the Bone. When the Blood is thus discharged, the broken Bone should be replaced, and, if possible, dressed with the eighteen-headed Bandage. But Wounds of this Kind, especially from large Pieces, generally take off the whole Limb, and too often the Patient himself.

Further Observations on Wounds in the Bones.

XIX. If the Joint be contused, and there be no Wound nor Fracture of the Bone, lest dangerous Symptoms should arise from any Injury of the Ligaments, Nerves, and Tendons, your Incision must be only in the Integuments and fleshy Parts. But if a noxious Humour be found in the Joint, the Ligaments also must be cut to let it out. Venesection and a proper Regimen are here very necessary, not without the Use of internal resolving Medicines, and powerful Externals. But if the Bones in the Joint are broken or shattered, the Limb can scarce be saved, nor the Patient himself, unless you take it off a little above the Wound. In Contusions of the Bones without a Fracture, if, after proper Incisions, a violent Pain remains in the Bone; if the neighbouring Flesh is pallid, the Bone of a darkish Colour, with a large Suppuration; in this Case either the Limb must be taken off, or, as LE DRAN advises, the Bone must be trepanned upon the Wound, to open a Passage for the confined Matter. If, in this Case, the Pains are very acute, unless you amputate, the Patient generally dies convulsive. The broken Bone, when rejoined and properly dressed, should be constantly kept in an elevated Posture.

In Case of Delay.

XX. If a Surgeon be not timely called in, and the extraneous Bodies remain long in the Wound, from whence arise Tumors, Inflammations, violent Pains, and other bad Symptoms; the Lips of the Wound must be greatly enlarged, and deep Incisions made in the Tumors. By this Means you raise a fresh Hæmorrhage, the Swelling and Inflammation abate, and the foreign Bodies are easily extracted. But in all these Incisions, especially in the Limbs, the *Tournequet* should be applied to the Part.

Of more extraneous Bodies.

XXI. But as two Balls are often concealed in the same Wound, after the Removal of one, the Surgeon should diligently search for another, or for any other extraneous Body that may be forced in with it: For unless every thing foreign be first removed, it is in vain to expect the Cure of the Wound.

Other necessary Observations.

XXII. When you attempt the Extraction of a Ball or other extraneous Body, you should endeavour to place your Patient in the same Situation he was in at the Time of receiving the Wound: For by frequent Changes of the Situation, the Ball will easily bury itself, and get out of your Reach. If the Wound cannot easily be enlarged, nor the Balls extracted without great Pain and Danger, they must be left in the Wound, either till the Pain is abated, or the Passage rendered so easy by Suppuration, that they work themselves out. On the other hand, extraneous Bodies are instantly to be removed, where there is Danger of bringing on Convulsions, Pain, or Inflammation, by being left behind.

Balls lodged in the Thorax or Abdomen.

XXIII. If a Ball has passed into any Cavities of the Body, where the Extraction of it cannot be attempted with Safety, it is best to leave it where it has lodged, and heal the Wound. For there have been Variety of Instances, where Persons have carried Balls in them for many Years, nay, for the best Part of their Lives, without suffering any Inconvenience. It sometimes happens that they work themselves out into some other Part of the Body, from whence they may be extracted with Safety.

Balls lodged in the Viscera.

XXIV. But if a Ball be lodged in a Viscus, as the Brain, Lungs, Liver, Spleen, &c. that you can neither see, nor reach it, the Case is generally mortal.

If

If you can see it, it is only on the Surface. Therefore by enlarging the Wound of the Viscus, as far as is convenient, you will make room for the Pliers or Forceps to extract the Ball, which must be introduced with the utmost Caution.

XXV. When the Wound has been cleared of the extraneous Bodies, and the Hæmorrhage stopped, you must endeavour to remove the Eschar by Suppuration. In the next place you attend to the bad Symptoms arising from it, such as violent Swellings and Inflammations, Fevers, Gangrene, and Mortification, excessive Weakness, Nausea, &c. some of which are to be prevented, and others remedied. To prevent therefore violent Swellings and Inflammations, which are here always dangerous, and often bring on a Gangrene and Mortification; besides proper Incisions, you should apply externally *Spirit. Vini simp.* if the Wound be slight: if not very slight, add to each it of the *Spirit. 3*ls of *Sal. Ammoniac.* or *Aq. Calc.* with about a fourth Part of *Spirit. Vini Camphor.* with a little of the *Sal Ammoniac.* Thick Compresses dipped in this Mixture should be applied warm to the affected Part several times in the Day. If in Parts that are contused and greatly inflamed, the Blood should be concreted under the common Membranes of the Muscles; these Membranes must be scarified without reserve, not only in their longitudinal, but in every Direction: for otherwise the stagnated Blood cannot be removed, and of Consequence a Gangrene and Mortification would arise, or at least very dangerous Abscesses. And sometimes you must cut even the Tendons, especially in Wounds of the *Tarsus* and *Metatarsus*, where you have acute Pains, that may be attended with Danger.

The Treatment of the Wound, when cleansed.

XXVI. Where there is a very great Corruption of the Parts, after repeated Scarifications apply the digestive Ointment; to which you may add a little Myrrh or Aloe, *Unguentum fuscum*, or red Precipitate. Let the Wound be dressed with these, till the injured Parts are separated, and the rest well cleansed. Then let it be treated as a simple Wound.

A great Corruption of the Parts.

XXVII. In deep Wounds where the Ball has gone quite through (especially if they happen in the Buttocks or Thigh, and the Passage of the Ball is oblique) a particular Method is to be used. After scarifying the Lips of the Wound, a Skein of Thread is to be drawn through the Eye of a long blunt Needle, (*Plate V, Fig. 1.*) and, being well saturated with the Ointment we have prescribed, passed through the Wound in the Manner of a Seton. It should be kept there, till you discover by the Redness of the Wound that the corrupted Parts are cast off, and the whole is in a readiness to heal. LE DRAN absolutely rejects the Setons; but I have often seen the good Effects of them. You should take particular Care that the Thread be very soft.

Of Setons in Nervous Wounds.

XXVIII. Gun-shot Wounds, though in the strongest Constitutions, generally produce the worst of Symptoms; as excessive Weakness, Faintings, Tremors, Palpitations, Convulsions, Hiccoughs, &c. after which succeed instantly dangerous Fevers, nauseous Vomitings, and the like. All which require the particular Attention of the Surgeon.

Symptoms of these Wounds.

XXIX. Amongst the many terrible Symptoms attending these Wounds, the first is an excessive Languor, which is soon followed by fainting Fits, partly occasioned by the Hurry of their Spirits, and partly by the Effusion of Blood. If from the first Cause, Draughts or Mixtures composed of Cordial Waters, Cardiac Powders, and a strengthening Diet, are to be prescribed. If from the latter, to recruit their Strength and replenish their Veins, let them indulge in all

Weakness.

all things nourishing; as the *Decoct. Hord. vel Aven. Corn. Cerv. Citrat.* for their common Drink, with a small Quantity of Wine or generous Beer, Milk, Emulsions, good Broths, and comfortable Juleps.

2. Nausea.

XXX. Some are seized with a violent Nausea, or Abhorrence of Food. This arises partly from the Terror they are under, and partly from too great a Repletion before the Accident. It is too customary with military Men to eat and drink freely, as if by this means they acquired fresh Strength. Hence, on a sudden Fright, the Motion of the Stomach being inverted, and the Digestion disturbed, a Nausea is the Consequence. In such a Disorder, as Experience teaches, that those who vomit spontaneously receive great Benefit, we should here apply a gentle Emetic, and then settle the Patient's Stomach with a Cordial Draught. By this Method his Appetite and his Strength generally return; and the Cure of the Wound is happily promoted. If the Patient is averse to an Emetic, you should give some proper Purgative in its stead.

Vulnerary Fevers.

XXXI. Intermitting Fevers in vulnerary Cases are to be treated like others of the same kind: but be sure to give an Emetic at the beginning. But if an acute Fever come on, attended with frequent Horrors, as they indicate strongly internal Inflammations, we must bleed the Patient in Proportion to his Strength and Fullness of Blood: then order him a gentle Dose of *Ipecac.*; some thin Liquor for his ordinary Drink; cooling Powders and Draughts, with Camphire, and a moderate Diet. He should take largely of the *Peruvian Bark*. But he must particularly abstain from Pork, from all salt Meats and of hard Digestion.

Pains and Convulsions.

XXXII. Pains and Spasms are generally produced, either (1.) By extraneous Bodies remaining in the Wound, which prick and vellicate the nervous Parts: or (2.) By large Tumors and Inflammations, which are always visible: or (3.) By the violent Collision and Laceration of the nervous and tendinous Parts. If these Symptoms arise from foreign Bodies, we must endeavour to remove them as soon as possible. If from excessive Tumor and Inflammation, these must be discussed the means above-mentioned. But if there be danger of a Gangrene and Mortification, besides the deep Incisions, frequently repeated for the discharge of the putrescent Blood, and besides the Medicines we before recommended, large Quantities of *Peruvian Bark* must be given inwardly; and Lint, well saturated with Spirit of Turpentine, be applied to the Wound. They are both excellent Remedies in this Case.

Amputation where necessary.

XXXIII. But if all these Remedies frustrate our Hopes, there remains one only, and, as CELSUS observes, a deplorable Refuge, the Amputation or the corrupted Part. But, whenever violent Pains, Spasms, and Convulsions are occasioned by the Collision or Laceration of the nervous or tendinous Parts; it is adviseable at the first, or very early at least, to cut the Tendons, Aponeuroses, and common Membranes of the Muscles that are injured, just above the Wound. For if these Symptoms are not speedily removed, Death must be the Consequence. But if this avail nothing, it is better at once to amputate the Limb, than by unseasonable Delays destroy the Patient: for these partial Convulsions soon become universal.

Fresh Hæmorrhages.

XXXIV. About the seventh or eighth Day, sooner or later, from the inflicting of the Wound, fresh Hæmorrhages usually succeed*. To suppress which, we

* When the *Eschar* separates.

must

must proceed, as above, and earnestly advise the Patient to indulge Rest, and stir as little as possible. Otherwise, these Hæmorrhages are too apt to return about the fourteenth Day.

XXXV. About the same time you have generally a Looseness, which some think not only unsalutary, but very prejudicial: but in general it should be esteemed salutary and critical; especially in corpulent Patients, and of a bad Habit of Body: for thereby many bad Symptoms are abated; and a Wound, which before was unpromising, takes a new Turn, and a different Aspect. Therefore we should by no means check it with Astringents; but gently assist Nature with warm, diluting, lubricating, and mucilaginous Draughts; with *Ol. Amygdal. dulc.* with lenient Clysters, till it stops spontaneously. But if it continue too long, we must then have recourse to the astringent Powders; particularly *Pulv. Rhabarb. cum Cort. Cascarill*. These should be repeated often in the Day; and at Night give a Dose of *Diafcoredium*, or *Theriaca ex aquâ Menthe vel Cinnam. Cydoniat.* Nor must a proper Regimen and Diet be omitted.

In Case of a Looseness.

XXXVI. If the Wound prove obstinate from any Venereal Taint, which will easily appear from other Symptoms of that Disorder, antivenereal Remedies must be applied. If there remain Fistulas, which are commonly occasioned by Fragments of the Bones, or extraneous Bodies being left behind; or if there is a Caries; these Symptoms are for the most Part easily removed by removing the Causes. But if the Wound is inflicted on the Breast, and part of its Substance destroyed by it, the Case is too generally fatal. A Caries often requires length of Time and Patience: yet Nature, if assisted with proper Medicines, frequently conquers it. It is no uncommon thing to see an Atrophy in the Limbs after violent Wounds, where the Parts are so lacerated, and the Circulation of the Blood so impeded, that they want their due Nutriment. In this Case, all strengthening and emollient Medicines, all Ointments and Fomentations are extremely efficacious, and particularly the use of natural Baths.

Venereal Symptoms, Fistulas, Caries and Atrophy.

XXXVII. In Gun-shot Wounds several Grains of Gunpowder frequently penetrate the Skin of the Face, and occasion a Deformity, if not removed: this may be done with a Pen, or an Instrument like an Ear-picker, *See Plate VI, Fig. 14.* But if they have penetrated too deep to be picked out in this manner, the Skin must be laid open with a fine small Lancet, that you may remove them with the Instruments we have described. Great Care must be taken not to break the Grains in picking them out; for they will occasion very foul Spots. The same Method is to be observed with regard to small Shot. If you would be further informed of Gun-shot Wounds, and the Writers on that Subject, turn to the XIIth Number of the Introduction to this Work; and consult particularly the excellent LE DRAN.

To extract Gunpowder and small Shot.

CHAP. IV.

Of WOUNDS of the ABDOMEN.

I. **W**E have hitherto considered what was in general to be attended to with regard to any sort of Wound, whether made by Cutting, Stabbing, or by the Explofion of a Gun. We come in the next Place to explain fully the Nature

The Intent of this Chapter.

Nature of each particular Wound, and shall speak distinctly of Wounds: 1. Of the *Abdomen*. 2. Of the *Thorax*. 3. Of the *Neck*. 4. Of the *Head*.

Differences
of Wounds
in the Abdo-
men.

II. *Wounds of the Abdomen* only affect the common Integuments and Muscles, or penetrate into the Cavity of the Abdomen. Those that penetrate into the Cavity of the Abdomen, are inflicted lengthways, obliquely, or transversely, and in these the Bowels either burst out through the Wound, or preserve their natural Situation. These differences of Wounds in the Abdomen ought to be diligently attended to by the Surgeon, since they require a different kind of Treatment.

How those
Wounds are
to be disco-
vered.

III. These Wounds may be conveniently enough examined; 1. By the Eye; 2. By passing the Finger or the Probe; or lastly, 3. By injecting warm Water into the Wound. If the Water meets with no Obstruction, you are sure that the Wound penetrates; but if it returns back upon you, and the Probe meets with Resistance, the Abdomen is not entirely opened.

Wounds that
do not pene-
trate.

IV. Wounds which do not penetrate the Cavity of the Abdomen, are attended with much the least degree of Danger. They are generally divided into two sorts. 1. Either the Wound is only upon the common Integuments; or, 2. The Muscles also of the Abdomen are divided, as far as the Peritonæum. The first of these is too slight to require a distinct Method of Cure from other Wounds: but Wounds of the last Class are extremely dangerous; because the Intestines, in this Case, easily fall through the Wound. If the Wound is large, great Skill is required in the Surgeon, especially if it is made in a transverse or oblique Direction. But if it is lengthways, by cleansing the Wound, applying the vulnerary Balsam, and a healing Plaster, with the large uniting Bandage, as at *Plate V, Fig. 8.* all will go well; if carefully dressed according to these Directions, and the Patient indulge Rest, and observe a proper Regimen, the Cure generally is effected without a Suture. But should the Wound be transverse or oblique, in this Case to prevent a Rupture the Suture is necessary to keep the gaping Lips of the Wound together, as we shewed partly above at *Chap. I, N XLIV.* The manner of performing this we shall describe below in a Chapter upon *Gastrography*. Having taken these Precautions for preserving the Peritonæum and Intestines in their natural Situation, the Surgeon ought to dress up the Wound with vulnerary Balsams, and an adhesive Plaster: to give the Patient Rest, to order him a soft Clyster if his Bowels are not naturally open, and to enjoin Abstinence.

How wounds
are to be
searched
when they
penetrate.

V. When the Surgeon discovers that the Wound penetrates into the Abdomen, he ought, before all things, to examine well, whether it be direct or oblique, and whether any of the Contents of the Abdomen partake of the Injury. He will easily determine in the Negative, if it shall appear; 1. That there is no great Degree of Weakness, Hæmorrhage, Pain, Fever, &c. 2. If upon laying the Patient upon the wounded Side, there is no discharge of Chyle, Gall, Excrement, or Urine. 3. If Milk, being injected warm, returns without any Alteration of its Colour. 4. If the inflicting Instrument is not very sharp; and lastly, 5. If there is no vomiting nor discharge of Blood by the Mouth, Stool, or Urine, nor Swelling and Hardness of the Belly. But as the Operation of *Gastrography* is sometimes extremely necessary, and always attended with Danger, if it is not performed with the greatest Accuracy, I have thought it my Duty to describe it carefully in the following Chapter.

C H A P. V.

Of GASTRORAPHY.

I. **G**ASTRORAPHY is the Suture of Wounds of the Abdomen. This Operation is unnecessary; 1. When the Wound is only in the muscular Part; or, 2. Is not very large, especially if it is made lengthways. For if the Wound should penetrate into the Cavity of the Abdomen, and even let out Part of the *Omentum* or *Intestines*; yet, where it is very small, as Wounds generally are which are made by Puncture, or happen lengthways, upon returning the Parts which are pushed out, stopping the Wound up with a soft Tent, and securing all with a proper Bandage, it may be healed without the help of the Needle. Besides, in fat Persons this Operation is very difficult, and it would be an act of great Cruelty in a Surgeon to perform the Operation upon a Man, when he might be cured after an easier Method.

When Gastroraphy is unnecessary.

II. But there are two Cases where Gastroraphy is absolutely necessary. The first is, where the Wound is so large, that there is no Possibility of retaining the Intestines by any other Method. For as the Intestines are continually pushed forwards in the act of Inspiration, by the Action of the Diaphragm and the Abdomen, the falling down of the Intestines in this Case is unavoidable, especially in large Wounds from a Cut, See *Plate III, Fig. 1, Lett. O*, and therefore the Operation necessary. But there is another Case also where this Operation is required; to wit, in large transverse Wounds of the Abdomen where the Muscles are divided, but the Peritonæum is not concerned. See *above Chap. IV, N. IV*.

When it is necessary.

III. In Wounds of the Abdomen the chief Enquiry is, *Whether the Omentum or Intestines are let out?* If none of these have burst through the Wound, the Lips of the Wound should be kept as close together as possible with the Hands, and the Patient kept with his Head laying downwards till the Wound is sufficiently secured from letting out the Contents of the Abdomen. But when the Intestines are already fallen out, they must be returned with the greatest Expedition, lest they should receive any Injuries from the external Air. But we should first examine whether they have received any Wound or not, and whether they preserve their natural Warmth and Colour. For where they are cold, livid, and dry, or wounded, they are not to be returned suddenly, but treated in the manner we shall describe below.

Of the falling down of the Intestines.

IV. You will easily perceive that there is some Hurt in the Intestines, though the Wound does not immediately appear, if there is a more than ordinary Flaccidity in them. When this Symptom appears, it will be proper to pull the rest of the Intestines gently forward, till you come at the Injury, and when you have found it, you may treat it as we shall shew you in *Chap. VI*.

How to discover a Wound in the Intestines.

V. When you find the Intestines uninjured, they must be instantly returned, to prevent them from receiving any Injuries from the external Air. In order to do this with the greater Ease, put the Patient in the supine Posture which we described at *N. III*, only placing him upon the Side opposite to the Wound. The Patient being thus situated, an Assistant should endeavour to return the Intestine with his two Fore-fingers, taking Care not to take off one Finger till the other is upon the Gut. The Patient should be encouraged all the while to

How to return the Intestines.

hold his Breath, and the Assistant should bring the Wound together with his Fingers, or with Hooks, *Plate VIII, Fig. 2, 3.*

How the Intestines are to be treated when they are dry and cold.

VI. Hitherto we have described the Method of returning the Intestine whilst it was warm and unwounded: it remains that we teach the Method of treating the Intestines when they are cold and dry. In this Case it is best to foment them with warm Water or Milk before you return them; or, where you can have that Opportunity, get the Cawl of a Calf, a Lamb, a Hog, or of any other Animal just killed, wrap this round the Intestines whilst it is reeking, and keep them in it till they recover their natural Heat and Colour. But if they do not return, all medicinal Efforts are vain: the Patient must die. If this Dryness or Coldness of the Parts is very small, and the Intestines are not at all corrupted, it is best to return them instantly into the Body, where the Heat and Moisture of the neighbouring Parts being natural to them, will give them a more speedy and natural Refreshment, than can be reconciled to them by any artificial Means.

How the Intestines are to be returned through a small Orifice.

VII. When the Intestines are forced through a small Wound, and are afterwards so distended with *Flatus*, that they cannot conveniently be returned, it will be proper to pull the Intestine gently forward, that more of it may come out, that so the *Flatus* being divided may take up less Room in any one Part. An Assistant should now gently dilate the Wound with his Hands, or two Hooks, *Plate VIII, Fig. 2, or 3.* fixed in the internal Membrane, that the Surgeon may return the Intestines, which when he has done in such a Manner that each Part may recover its natural Situation, (*See N. V.*) the Wound should be secured first with his Hand, that the Bowels may not burst out again. Then it should be filled up with some Dressings, or, where there is a considerable Quantity of Blood spilt in the Abdomen, with a soft^a Tent, *Plate II, Lett. L, M, N, O;* dressing it up with proper Plasters, Compresses, and Bandage. The Patient is to be kept as still as possible, lying as much as he can upon the Wound. After this the Wound is to be dressed daily, or, where there is a large Discharge of Matter twice every Day, with some vulnerary Balsam; and if we proceed in this Manner, where the Wound is not very large, the Patient may be excused from the Pain, and the Surgeon from the Trouble of making the Suture.

How small Wounds are to be enlarged.

VIII. But if the Wound is so narrow, that we can neither bring the Gut forward nor reduce it, it must be enlarged with a Knife, or the grooved Probe, called *Conductor*, beginning the Division at that end of the Wound which is most convenient, taking great Care not to wound the *Linea Alba*, the Vessels which lie under the *Musculi Recti*, or, lastly, the Intestines themselves. Some Surgeons, in the Room of the Incision Knife and Conductor, use in this Place the *Syringotomus*, whose Point is guarded with a Button, and which is used in *Fistulâ Ani*, (*See Plate XXXV, Fig. 4, 5.*) Some are fond of other Instruments; but I

^a See CELSUS, Book VII, Chap. 16.

Some of the modern Writers in Surgery, particularly GARENGEOT, forbid the use of Tents in all Wounds of the Abdomen. In the Year 1734, a young Surgeon in my Neighbourhood observed this Rule, when he was called to a Man that had received a Wound between the Navel and the Penis, the Wound penetrated the Abdomen; for the first two Days the Symptoms were favourable, but upon the fourth Day he died. Upon opening his Body, we found a large Collection of Matter in the Abdomen, with the Omentum putrified. If a Tent had been used, the Matter would have been discharged, and the Patient's Life saved.

think

think the best Instrument by far in this Case, is the Knife which I invented for this Purpose, and have given you a Description of at *Plate V, Fig. 3.* or one of those at 4 and 5. The Knife is never to be used, till the Assistant has applied a warm Omentum to the Intestines that are already extra-abdominal, to prevent them from Injuries. But where the Intestines are so inflated, that it is impossible to get the Probe End of the Knife, or a Conductor into the Abdomen, then hold back the Intestines with the Left-hand, and with the Right make an Incision through the common Integuments and Muscles as far as the Peritonæum; sponging up the Blood as you go on. The Wound will most likely be sufficiently relaxed by this to make way for the Readmission of the Intestines, at least it will admit the End of the Knife to divide the Peritonæum, so that you may enlarge your Wound at Pleasure, and return the Gut as directed at *N. V.*

IX. If any hardened Excrement lies in the Intestine, and impedes its Reduction, emollient Fomentations and Cataplasms should be applied, and more of the Intestine should be pulled out; for by this Means the Fæces may be divided by the Hands, and the Intestine returned conveniently. PARÆUS and other Surgeons have recommended a particular Method of returning the inflated Intestine without enlarging the Wound, by making small Punctures in the Intestine with a Needle, through which Punctures the wind will certainly escape, and the Sides of the Gut subside: and this, they affirm, is attended with no Danger. Nevertheless, for my own Part, I prefer the Enlargement of the Wound to making these Punctures, and to the pulling out of a greater Share of the Intestine to divide the Contents; especially since many Surgeons affirm, that these Punctures are neither safe, nor useful for the End to which they are directed. BLANCARD has given us an Instance where they failed, in his *Collect. Medico-Physic. Part. ult. Obs. I.*

How to return them without enlarging the Wound.

X. When the Intestines are returned, if the Wound is not large, and is made lengthways, there will be no Occasion to perform the Operation; which is always of dangerous Consequence, and therefore should never be attempted but in Cases of the greatest Emergency. If the Suture is not absolutely necessary, pass a soft Tent into the lower Part of the Wound, and apply sticking Plasters to the Sides of it, covering them with long thick Bolsters, securing these Dressings with a uniting Bandage, such a one as you will find described in *Plate V, at Fig. 8.* When the Patient is thus dressed, draw some Blood from the Arm, to prevent an Increase of the Inflammation; advise him to keep very still, and observe a strict Regimen with regard to his Diet. The Dressings are not to be removed, unless some violent Symptom requires it, before the third Day; and afterwards only once a Day, or rather every other Day, lest the Union of the Wound should be retarded by frequent Handling. On the other hand, if the Wound is large, and made in an oblique or transverse Manner, as described *Plate III, Lett. I, O,* so that the Intestines cannot be kept within the Abdomen by this Method, the Operation must be performed without Delay.

When and how to heal the Wound without the Operation.

XI. The Operation may be performed in the following Manner: Pass a strong double or quadruple Thread, well waxed, through two crooked Needles; (See *Plate VI, Fig. 5 and 6.* or another, which was communicated to me by a Friend, at *Fig. 7.*) with these stitch up both Ends of the Wounds, beginning at one End with the upper Lip of the Wound, passing the Needle through the

How to perform the Operation with two Needles.

Patritonæum, Muscles of the Abdomen, and the common Integuments, from within outwards, leaving about a Thumb's Breadth between the Stiches and the Mouth of the Wound, that they may take the stronger Hold, observing the same Method in passing the other Needle through the lower Lip. Whilst you are passing the Needle with one Hand, it will be proper to support the Lips of the Wound with the other, to prevent the Intestines from being wounded. It will frequently be very difficult to hold the Needle steady with the naked Hand; to remedy this Inconvenience, the modern Surgeons have invented an Instrument to receive the Needle, and form a Handle for it, which the *French* call *Portaiguille*. See *Plate VI*, *Fig. 2, 3, and 4*.

With a single Needle.

XII. If you are not provided with two Needles, the Operation may be performed with one: For, after you have stiched up one End of the Wound in the Manner we have described, you may take off the Needle, and perform the same Operation on the other End, and proceed afterwards as usual. Likewise, instead of Thread, a small kind of Lace^a, composed of six Threads, may be judiciously substituted; as the Threads themselves are liable to break, or they may sometimes cut through the Lips of the Wound, and destroy the Suture.

Large Wounds require many Stiches.

XIII. In a Wound of a middling Size, that is to say, of about two Fingers Breadth, one Stich in the Middle will be sufficient: But in larger Wounds, the Stiches must be repeated in Proportion to their Size, leaving a Thumb's Breadth between each of the Sutures, the Extremities of the Thread hanging down on each Side, as we have shewn you in *Plate III*, *Fig. 17*. and in *Plate IV*, *Fig. 15*. Having made the proper Number of Sutures, an Assistant should keep the Lips of the Wound together, whilst the Surgeon fastens the Ends of the Threads in Knots.

How the Knots are to be made.

XIV. Both Ends of the Thread are to be taken up, and to be tied first in a single, then in a slip Knot, as we taught above in *Chap. I. N. XLIV and XLV*. passing a small Bolster between the two Knots, (*Plate II*, *Fig. 22*.) to prevent the Skin from being hurt. Where there are more Sutures than one, you must begin at the upper Part of the Wound, tying them down in Order, that, before the last is tied, a soft Tent, of the Size of a Finger, with a Thread fastened to the End of it, may be introduced into the lower Part of the Wound. This Tent will keep a Passage open for the Evacuation of grumous Blood or Matter, which may be collected in the Cavity of the Abdomen. Some of the modern Surgeons, particularly GARENGEOT, absolutely forbid the Use of Tents in these Wounds; and assert, that the Spaces left between the Sutures will afford a sufficient Passage for the Discharge of Matter from the Abdomen; but I believe this frequently proves to be very false. See the Observation which we have added by way of Note to *N. VII. of this Chapter*. This one Fact has more Weight with me than all the ingenious Reasons that can be brought to support the contrary Opinion.

How the Wound is to be dressed after being stiched.

XV. The Stiches being all tied, and the Tent passed into the lower Part of the Wound, the Wound should be well anointed with some vulnerary Balsam, and covered with Pledgits of Lint, a sticking Plaster, and Bolsters, securing all with the scapulary Bandage. See *Plate III*, *Fig. 1*, *Lett. B, C*. At every Dressing the Surgeon should be very cautious in removing the Bandage, Bolsters,

^a See PALVINUS's Surgery, *Cap. de Gastroraphia*.

&c. the Tent should be taken out, and the Patient turned upon the wounded Side, that if any Matter is collected in the Cavity, it may be easily discharged. Where there is a large Collection of Sordes, it will be proper to prepare a *vulnery Injection*, ex *Decocto Herbe Agrimonie, Saniculae vel Hyperici, admixto Rosarum Melle*. This Medicine should be thrown by a Syringe moderately warm into the Cavity of the Abdomen twice or thrice at every Dressing, turning the Body afterwards upon the Wound, that the Blood and Matter, which are mixed with the Injection, may be evacuated with it. Having proceeded in this Manner, pass a new Tent into the Wound, moistened with some digestive Ointment, and dress up as before. This Method of cleansing the Parts, and dressing the Wounds, is to be repeated daily, till there remain no Signs of any Foulness within. After this the Tent may be removed, and the Wound healed after the usual Methods. To forward this Intention, Rest and proper Regulations in Diet are very serviceable, advising the Patient to lye as much as possible upon the Wound, placing a soft Pillow immediately under it; for, by this Posture, the Matter meets with a more ready Discharge; and the Lips of the Wound are induced to heal, from constant Pressure.

XVI. Those Wounds also require the Suture, which are extended as far as the *Peritonæum*, though they do not break through it into the Cavity of the Abdomen: For in this Case the *Peritonæum* is in constant Danger of being too much distended, from the vehement Motions of all the Parts of the Abdomen, in Breathing, Rising, Walking, at the Expulsion of the Excrements, &c. Upon the Relaxation of this Membrane the Intestines would soon make their Way between the Muscles, and bring on very bad Symptoms and dangerous *Hernie*. These Mischiefs cannot better be prevented than by performing the Operation described above at N. XI, XII, XIII. but we must observe in this Case, that as the *Peritonæum* is not wounded here, the Needle must pass only through the Muscles, and common Integuments.

Another
Case which
requires this
Operation.

XVII. The Surgeons for many Years performed this Operation of stitching up Wounds of the Abdomen with the interrupted Suture, and preferred that to all other Methods. But several amongst the Moderns, as we hinted above, prefer the quilled Suture (by the French called *Enchevillée*) in all large deep Wounds, but more particularly in Wounds of the Abdomen. For as the Muscles of the Abdomen, above all other Parts, are subject to violent Motions in Breathing, Sneezing, Coughing, and from many other Causes, by which Motions the Threads have sometimes burst through the Lips of the Wound, and great Mischiefs have ensued; some modern Surgeons therefore, and particularly DIONIS, have introduced the quilled Suture again in this Case, which had been before rejected. But to prevent the Lips of the Wound from suffering by the Pressure of the Pieces of Wood, which were formerly used in this Suture, he substitutes Rolls of Silk spread with some Plaster in their Room, as we shewed above, B. I, Chap I, N. XLVI. and at Plate IV, Fig. 16. by which Method the Cure will be effected more successfully, and with more Ease to the Patient. In large transverse Wounds of the Abdomen, which do not pass through the *Peritonæum*, PALFYNUŠ advises the Use of this Suture, which is to be performed according to the Method I have described above in the first Chapter, N. XLVI.

The quilled
Suture used
here.

XVIII. GA-

GAREN-
GEOT's Me-
thod,

XVIII. GARENGEOT prefers this Suture to all others, even in Wounds that penetrate into the Cavity of the Abdomen, and recommends the following Manner of performing it. Instead of a double Thread, he twists six or eight strong Threads together, like a Lace, and waxes them well, passing them through the Eye of a large crooked Needle, such an one as is described in Plate VI, at Fig. 5 or 6. The Surgeon takes hold of the Needle at the blunt End with his Right hand, and passes the Thumb of his Left hand into the Wound, raising the upper Lip with it, whilst he fixes the Fingers of the same Hand upon the external Part of the Lip: He then introduces the Point of the Needle into the Abdomen, and raising it up about two Fingers Breadth from the Opening of the Wound, pierces through the *Peritoneum*, Muscles, and common Integuments. Then taking off the Needle, he fixes it to the other End of the Thread, and lifts up the lower Lip of the Wound, by introducing his fore and middle Fingers under it, and clapping his Thumb upon the external Part of it; and pierces it with the Needle in the same Manner he did the upper Lip. If the Wound is four Fingers long, it will be necessary to make two Stiches, at equal Distances from each other, and from the Extremities of the Wound; if it is less^a, one will be sufficient; if it is larger, more than two are required. The Threads are to be unravelled and divided into three equal Parts at each End; through two of these Parts the Rolls of Plaster are to be passed on each Side of the Wound, and to be fastened on with bow Knots. Then the *Balsamum Arcaei* must be laid on with some Lint, and that fastened again, though not too tight, with the remaining Part of the Threads, in the same kind of Knots. The Abdomen is to be well bathed *cum Oleo Rosarum calido pauco Spiritu Vini admixto*. This Embrocation is to be used chiefly upon the Parts near the Wound, and about the Region of the Navel; a large Bolster wet with the same Medicine is to be applied to these Parts, and over this another dipt in *Oxycrato calido*. These Applications are to be covered with Flannel well soaked in an emollient Decoction: The whole is to be secured with the Scapulary Bandage and Napkin; the Napkin is suspended by the Scapulary, which in this Case ought to come somewhat lower than usual. See Plate III, Fig. 1, C.

How to heal
the Wound,

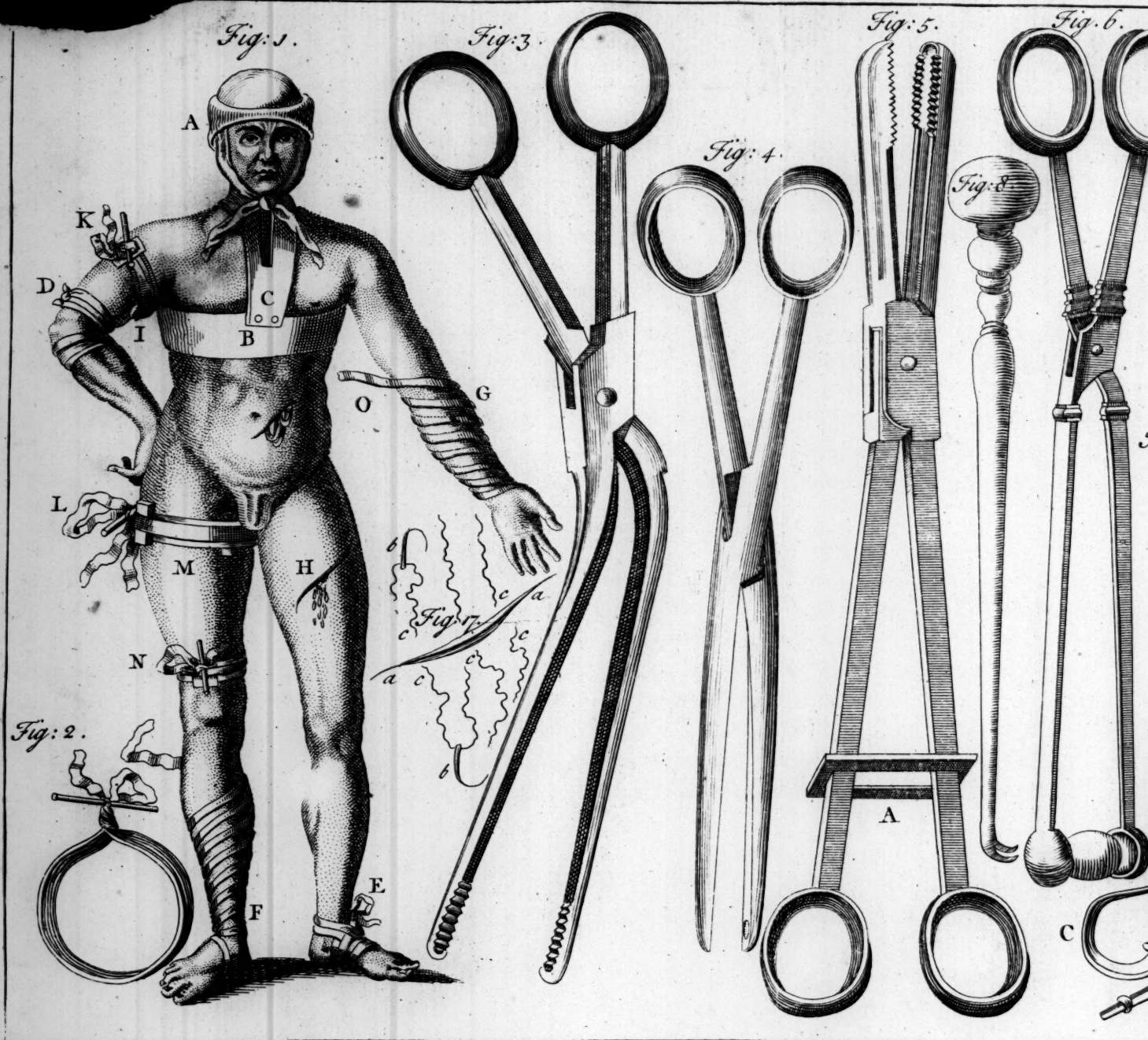
XIX. When the Lips of the Wound about the Sutures appear to be united, which you will perceive by the loosening of the Threads, you may cut the Knots, one after another, either at the same Time, or on different Days, as you shall see Occasion: And when you have gently drawn them away, as we taught you at N. XLIX, the rest of the Cure will easily be performed by the Assistance of some vulnerary Balsam and sticking Plasters. You must take great Care not to draw the Stiches too soon, for by that Means the Lips of the Wound would burst open again, and bring on grievous Mischiefs. Besides, a Bandage must be continued on the Abdomen for a considerable Time.

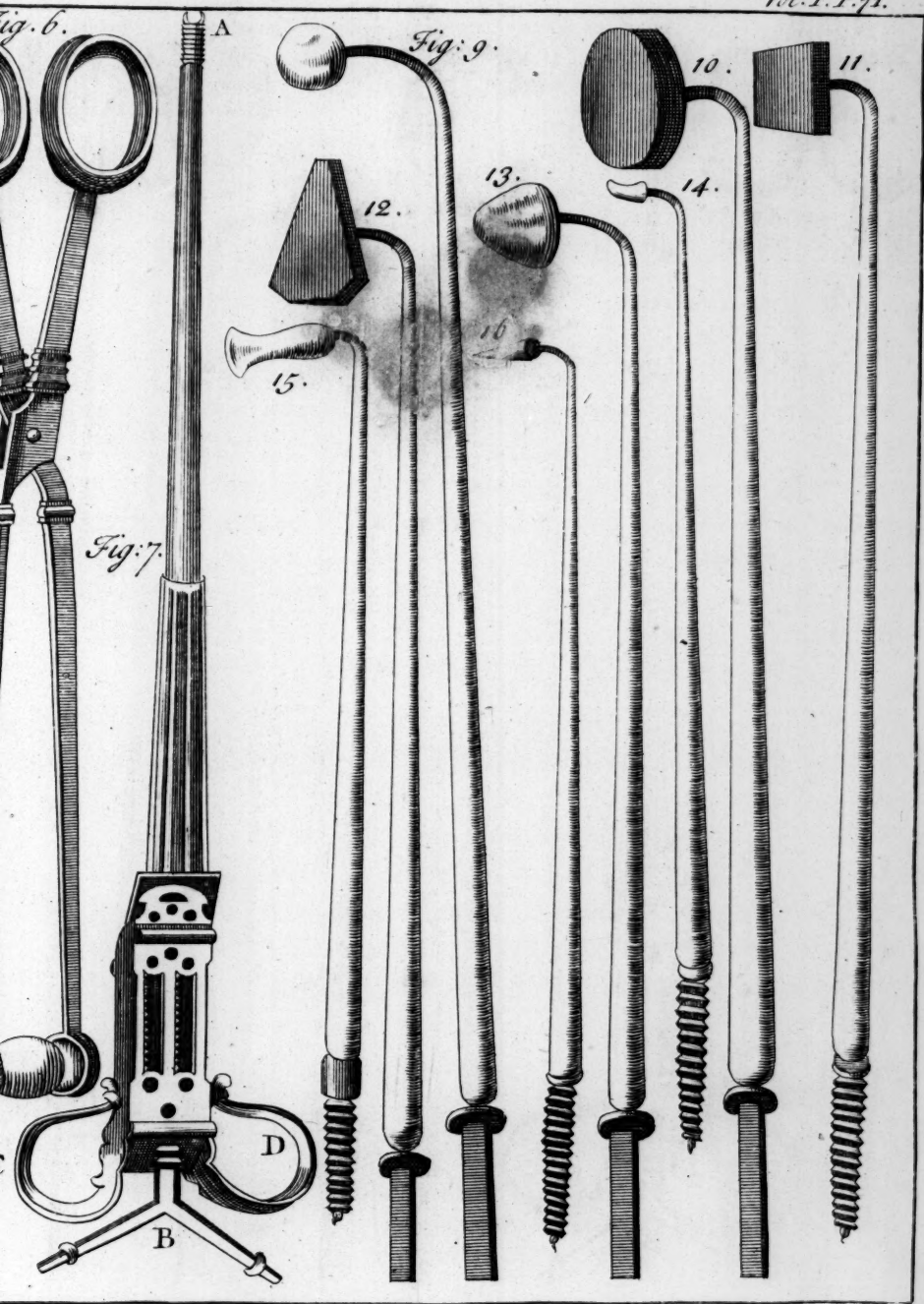
EXPLANATION of the THIRD PLATE.

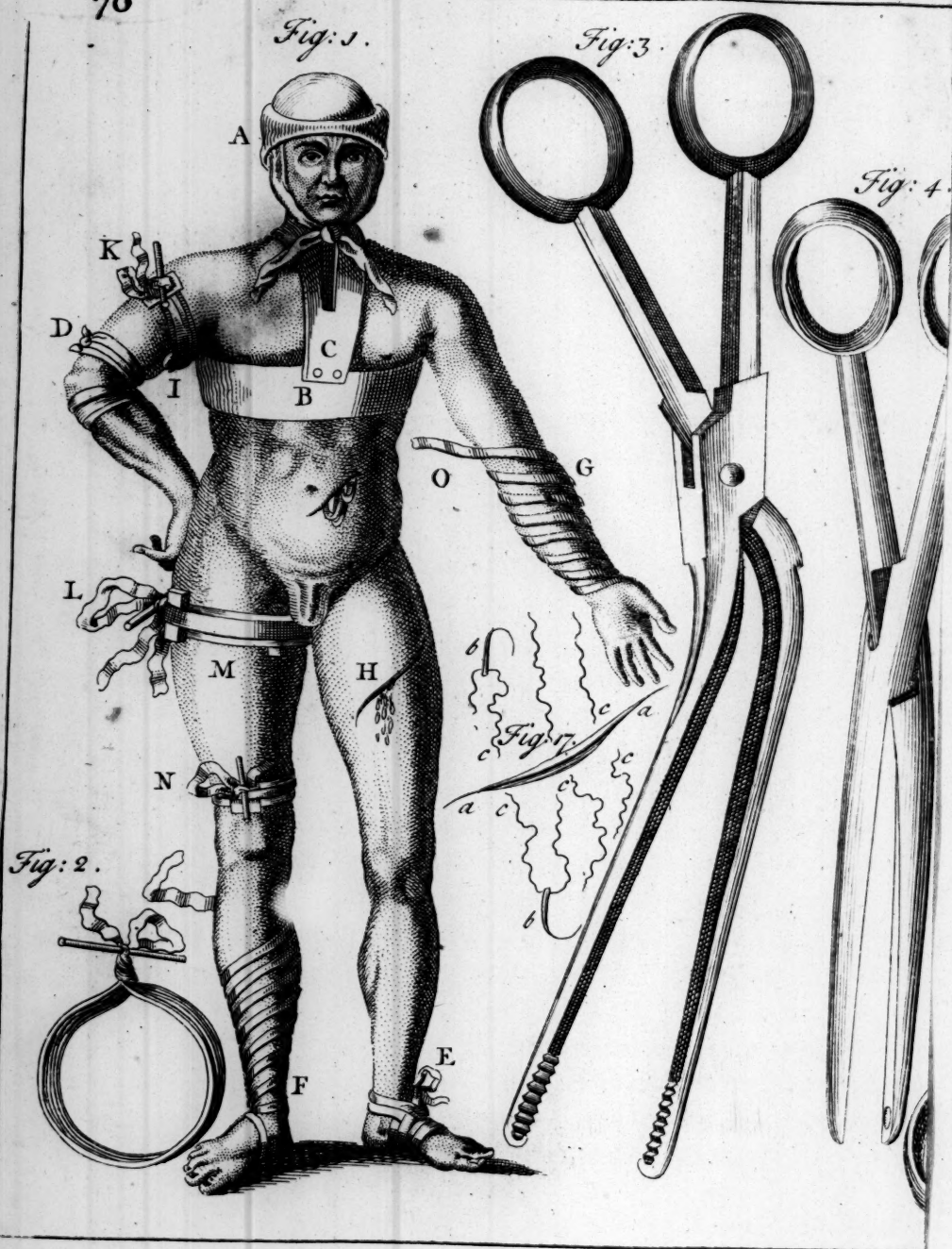
Fig. 1, Letter A, Describes how the *Grand Capital Bandage* is to be applied after the Operation of the Trepan, or after Wounds of the Head.

^a GARENGEOT, *Operat.* Tom. I. p. 220. Edit. 2d. But I wish he had been more accurate in describing how the quilled Suture could be performed by one Puncture; for two at least are required to keep the Quills firm.

B, The







observes, *Lib. VII, Chap. 16.* sometimes admit of the Suture to advantage, it is better to use a doubtful Remedy than none: Therefore the Surgeon should never neglect examining whether the Intestines are injured, that he may use all probable Means of healing them. See above *Chap. V, N. IV, V.*

When the Suture is not to be attempted.

II. Small Wounds of the Intestines, that do not exceed in Size the Diameter of a Goose Quill, should by no Means be stiched, but are best left to Nature. If they are left to themselves, they will frequently unite much sooner than if they are irritated by the Suture: For Stiching usually brings on great Pain, Inflammation, and other bad Symptoms. Therefore it will be much better to return them instantly, (*See Chap. V, N. V.*) and to bleed the Patient to prevent Inflammation, advising him to Rest and Abstinence. For it is better by Industry and Care to cherish even small and glimmering Hopes, than through Fear and Negligence to give the Patient over.

How the Opening is to be performed.

III. But large Wounds of the Intestines, though they seldom admit of Cure, are to be stiched up with *the Glover's Suture*, before the Intestine is returned: To perform this you should be provided with a fine Needle threaded with Silk. An Assistant should take hold of one Part of the Gut, with a fine Piece of Linen well aired before the Fire; whilst the Surgeon should hold the other Part in his Left-hand, and sew up the whole Wound after the Glover's Manner, leaving very small Spaces between each Stich; to wit, little more than a Mathematical Line. The last Stich should be fastened with a Knot, but the other End should hang about a Foot out of the Abdomen, by which the Silk may be drawn out when the Intestine is healed, *See Plate IV, Fig. 20.* Some in this Case prefer the *interrupted Suture*, because it is performed with fewer Punctures, and therefore is not liable to bring on so great Inflammation; though the Threads, which are very small, should be left behind. GARENGEOT proposes another Method of performing *the Glover's Suture*, in *Operat. Chirurg. Artic. de Gastroraphia.* But to say Truth, Experience shews us, that very few are saved, whatever Suture is made use of.

What is to be done afterwards.

IV. After this Operation is performed, the Wound of the Abdomen is next to be taken Care of, and stiched up, as we have shewn in the former Chapter upon that Subject, always observing the Caution I there laid down, which I cannot inculcate too frequently, of keeping the depending Part of the Wound open with a Tent, till all the præternatural Fluids are discharged from the Cavity of the Abdomen, and until the Union of the Wound in the Intestine shall render it proper to draw out the Silk with which it was stiched up.

How the Wound is to be dressed.

V. There is no Necessity for explaining to you the Method of cleaning, dressing, and healing the Wound. We have already spoken sufficiently on that Subject in *Chap. V, N. XIV.* and the following Numbers. Only I would furnish the Surgeon with this farther Caution, that where two Threads hang down from the Belly, one belonging to the End of the Tent, the other to the Suture of the Intestine, it will be proper to distinguish them by different Colours, to prevent mischievous Mistakes.

An easier Method of healing Wounds of the Intestines.

VI. As the modern Surgeons have found by Experience, that scarce any are saved who have received Wounds in the Intestines, and that in those few who do recover, the wounded Parts, from the Fineness of the Coats of the Gut, do not properly unite, but rather adhere to the inner Part of the *Peritoneum*, or to the *Omentum*, or to some of the other Intestines; it is no wonder, therefore, that they entirely

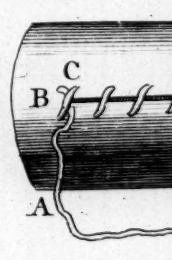
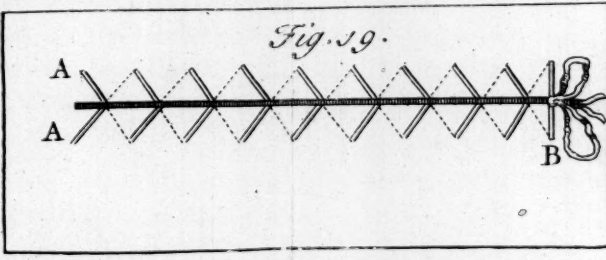
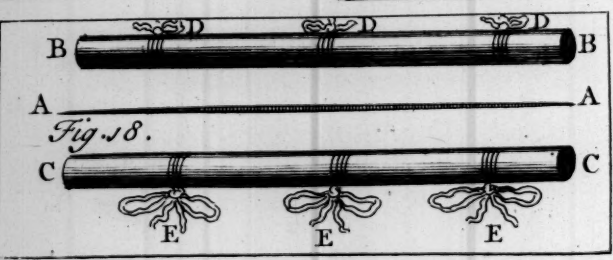
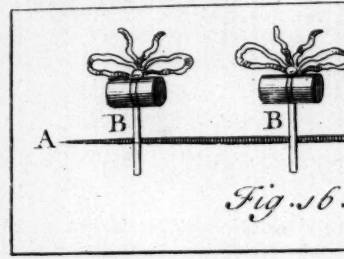
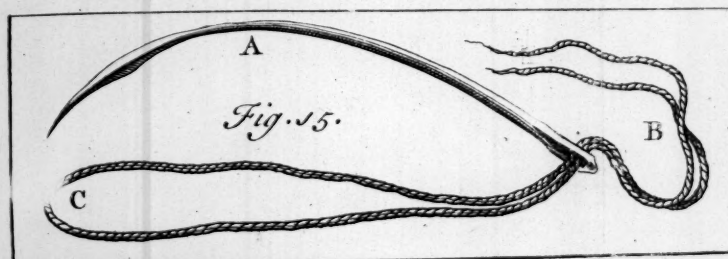
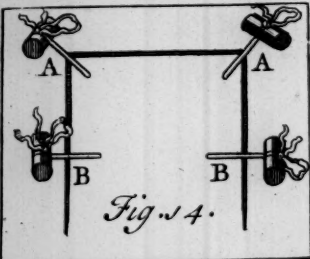
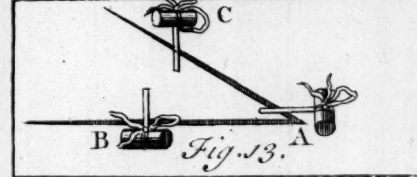
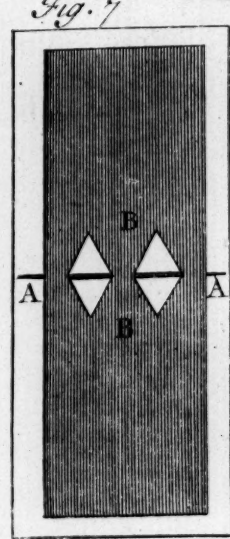
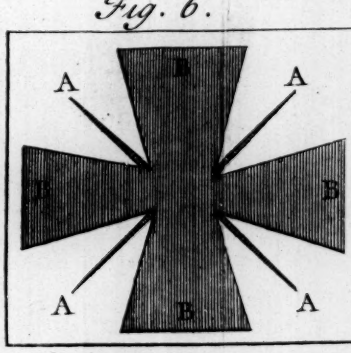
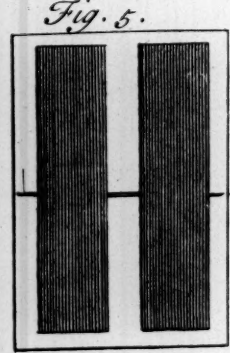


Fig. 2.



Fig. 8.

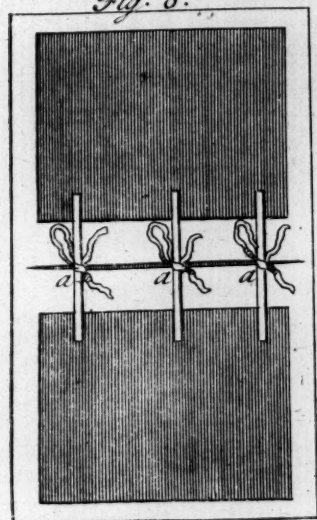


Fig. 9.

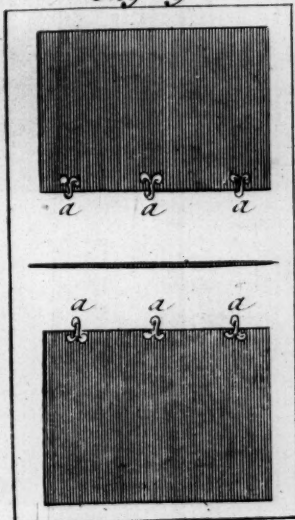


Fig. 10.

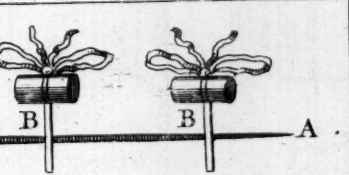
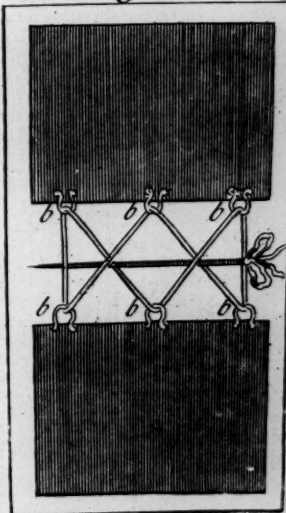


Fig. 16.



Fig. 17.

Fig. 20.

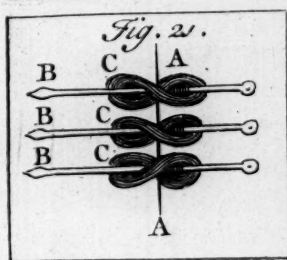


Fig. 21.

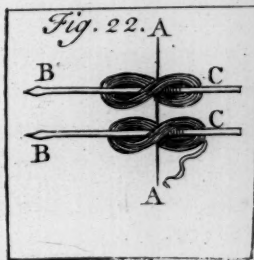


Fig. 22.

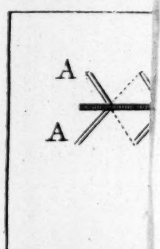
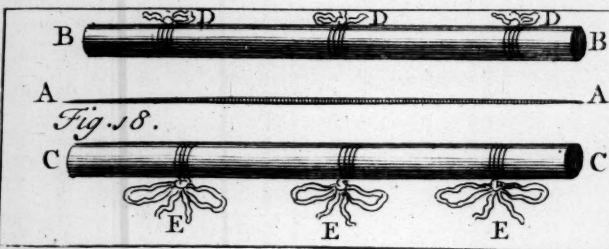
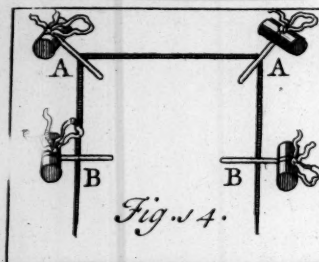
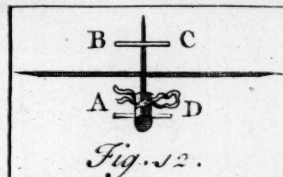
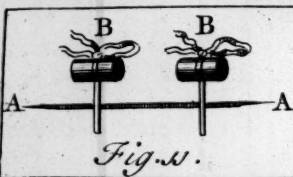
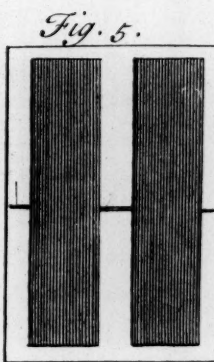
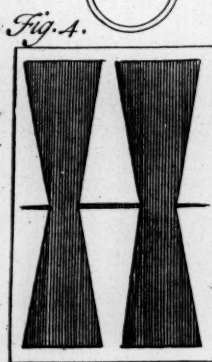
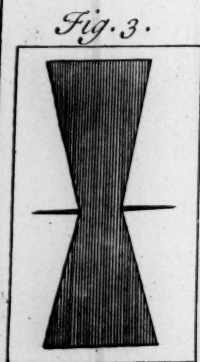
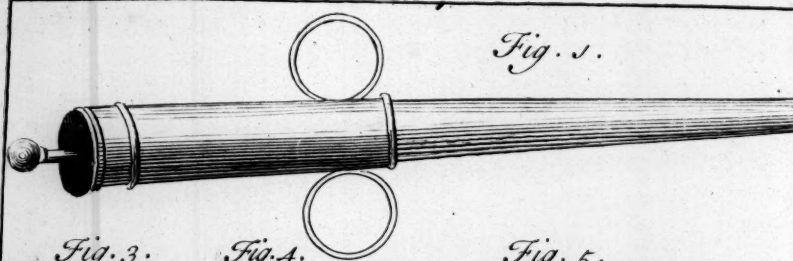
When the
Suture is not
to be at-
tempted.

How the O-
pening is to
be perform-
ed.

What is to
be done af-
terwards.

How the
Wound is to
be dressed.

An easier
Method of
healing
Wounds of
the Inte-
stines.



intirely lay aside the Practice of stitching up the wounded Parts of the Intestine, especially with uninterrupted Stiches, like the *Glover's Suture*: which by the frequency of the Puncture brings on a violent Inflammation, the most acute Pains, Convulsions, nay, sometimes Cancer or Mortification, and Death itself. But they rather chuse now to deal more tenderly with the Patient, and to substitute a gentler Method of Cure. In Consequence of which, the present Practice is to pass a waxed Thread through a fine Needle, and with this to fasten the wounded Part of the Intestine to the internal Orifice of the Wound of the Abdomen. The Thread that hangs out of the Abdomen is to be so firmly fixed by the Application of sticking Plasters to the Wound, that the Intestine cannot recede from the Part to which it was fastened, nor can it evacuate any of its Contents into the Cavity of the Abdomen. When this Operation is well performed, the Intestine easily adheres to the internal Part of the Abdomen, and the Patient suffers infinitely less Pain and Hazard, than from the former Method of making the Sutures. The same Regulations in Diet, and the same Methods of Dressing, and the bleeding the Patient, which we advised above at *Chap. V, N. XIV. and the following Numbers*, are to be observed. The same Method of Cure will also serve for Wounds of the Stomach, where they are within the reach of the Hand, and it is sometimes crowned with Success. See *BOHNII lib. De renunciatione Vulnerum, Sect. II. Chap. V.*

EXPLANATION of the FOURTH PLATE.

Fig. 1. PETIT's triangular Needle, for making a new Aperture in the Part opposite to the Wound, which the *French* call *Contre-ouverture*.

Fig. 2. My Improvement upon PETIT's Needle, which will take place where a strait Needle cannot safely be used, See *Book I, Chap. I, N. XXXVII.*

Fig. 3. AA, represents a Wound, the Lips of which are to be united by the Sticking Plaster indented on both Sides at BB.

Fig. 4. Shews a Wound to which two Sticking Plasters are applied.

Fig. 5. A Wound of the like Nature, to which are applied two Sticking Plasters without Indentations.

Fig. 6. A Wound made cross-ways, AAAA, united by two Plasters laid cross-ways, BBBB.

Fig. 7. A Wound AA, to which a Sticking Plaster is applied, with two Openings in the Middle, BB.

Fig. 8. A Wound united by the Application of two Plasters, with Tapes fixed to each of them, which are drawn together and fastened with slip Knots, *aaa*.

Fig. 9. The same Wound with Plasters of the same kind, furnished with Hooks, *aaa*, instead of Tapes, by which, with the Assistance of Threads tied to them, the Lips of the Wound are drawn together.

Fig. 10. Another Method of doing the same Thing, used by the Antients:

Fig. 11. A Transverse Wound, AA, united by the *Interrupted Suture*, BB.

Fig. 12. Shews in what Manner a cross Wound is to be stitched up, and the Lips of it brought together by drawing the Threads tight, ABCD.

Fig. 13. Where the Stiches are to be made in a Triangular Wound, ABC.

Fig. 14. How a Wound with two Angles is to be stitched with the *interrupted Suture*, first at the Angles, AA, and then, if it is necessary, on each Side at the Letters, BB.

Fig. 15. A large crooked Needle, for sticking large Wounds, with a double Thread, to make the *quilled Suture*. A is the Needle; B the double Thread; C the Bow-end of the Thread.

Fig. 16. A large Transverse Wound, A A, united by a Triple Interrupted Suture, B B B.

Fig. 17. The same kind of Wound, D D, which besides the Threads at Fig. 16. is furnished also with small cylindrical Rolls of Silk spread with some Wax or Plaster, A A and B B: the Threads on the upper Lip of the Wound are tied in slip Knots, C C C, whilst the Roll that lies on the under Lip is confined between the Bow-ends of the Threads, E E E. In a word, this shews PALFYNUS's Method of making the *quilled Suture*.

Fig. 18. Shews you another Method of making the *quilled Suture* in large transverse Wounds, particularly in those of the Belly, which is called *Gastroraphy*, See Book I, Chap. V, N. XLVII; and Chap. V, N. XVIII. A A, the Wound. B B, the upper Roll. C C, the lower Roll. D D D, the single Knots which confine the Lace, composed of six or eight Threads, and the upper Roll. E E E, the slip Knots which secure the lower Roll.

Fig. 19. CELSUS's Suture, which he describes at Lib. VII, Chap. XVI, for performing the Operation of *Gastroraphy* with two Needles. But this is a bad Method, and out of Practice. A A, the Stiches. B B, the End where they are fastened in a Knot.

Fig. 20. The *Glover's Suture*, used for uniting Wounds of the Intestines. A A, the Intestine. B B, the Wound. C, the beginning of the Suture, with part of the Thread hanging out. D, the End of the Suture, where it is fastened in a Knot.

Fig. 21, 22. The Suture for the Hare Lip, which is made with two or three Needles. A A, the descending Wound. B B, Needles passed through the Lips of the Wound. C C C, the Thread twisted round the Needles.

C H A P. VII.

Of LOSS OF SUBSTANCE in the INTESTINES.

What is to
be done
when there
is a Loss of
Substance.

I. **W**HERE any Part of the Intestine is carried away, the Case seems to be plainly desperate. It was therefore wonderful that Persons thus wounded did not all die upon the Spot, or in the Operation of making the Sutures: till ^aHILDANUS, ^bBLEGNY, ^cDIONYS, ^dPALFYNUS, ^eJO. M. HOFFMAN, ^fSCHACHER, ^gVATER, ^hCHESELDEN, HEISTER, and others, observed, that the Lips of Intestines so wounded, would sometimes quite unexpectedly adhere to the Wound in the Abdomen; and therefore there seemed to be no Reason why we should not take this ⁱHint from Nature. Whenever therefore a Surgeon is called

^a Observ. 74. Cent. I. Obs. 72. Cent. VI. ^b Zodiac. Med. Gall. An. 2. pag. 123. ^c In Chirurg. cap. de Gastroraphia. ^d In Chirurg. cap. de Gastroraph. ^e Disq. Corp. Hum. Anat. Path. ^f In Dissert. de Morb. ex situ Intestin. ^g In Dissertat. de Vuln. in Intestin. lethal. ^h Lib. de alto apparatu.

ⁱ A Surgeon tried this first with Success upon a Dog. See BLEGN Zodiac. Gall. An. 2. p. 143. afterwards it was performed upon a Man. See Miscell. Natur. Curios. Dec. 2. An. 8. Obs. 229.

to a Case of this Kind, after he has diligently examined the State of the Upper Part of the Intestine, which has suffered a Loss of Substance, he should stitch it to the external Wound, either by the continued or interrupted Suture. For by this Means the Patient may not only be saved from instant Death, but there have been Instances where the wounded Intestine has been so far healed, that the Fæces which used to be voided *per Anum*, have been voided by the Wound in the Abdomen: Which, from the Necessity of wearing a Tin or Silver Pipe, or keeping Cloths constantly upon the Part to receive the Excrement, may seem to be very troublesome: But it is surely far better to part with one of the Conveniencies of Life, than to part with Life itself. Besides, the Excrements that are voided by this Passage, are not altogether so offensive, as those that are voided *per Anum*.

II. The same Method of Cure may conveniently enough be put in Practice, where any Part of the Intestine is mortified by being forced out of the Abdomen. For in this Case, if you tie up the mesenteric Arteries, the corrupted or mortified Part of the Intestine may be cut off, and the remaining sound Part made to adhere to the Wound of the Abdomen. For it is better to try this Method, though but few should be saved by it, than to suffer all to perish, as CELSUS observes; It is wiser to attempt a doubtful Remedy, than absolutely to despair. I once published a Cure of this Kind in a Dissertation containing various Observations, printed at *Helmstadt*.

How a mortified Gut is to be treated.

III. When the Intestines are wounded, but not let out of the Abdomen, and therefore their Wounds are out of Reach, the Surgeon can do nothing but keep a Tent in the external Wound, according to the Method of Dressing laid down at *Chap. V, N. XIV.* and after this, bleed the Patient, if his Strength will admit of it, advising him to rest, to live abstemiously, and to lie upon his Belly. The rest is to be left to Divine Providence, and the Strength of his Constitution. But the Question may be asked here, Whether a Surgeon may not very prudently, in this Case, enlarge the Wound of the Abdomen, that he may be able to discover the injured Intestine, and treat it in a proper Manner? Truly I can see no Objection to this Practice, especially if we consider, that upon the Neglect of it, certain Death will follow; and that we are encouraged to make Trial of it by the Success of others. SHACHERUS, in *Programmate Publico, Lipsiæ edit. 1720*, mentions a Surgeon who performed this Operation successfully. So CHESelden of *London* gives us an History where in the *Hernia incarcerata* he laid open the Abdomen, returned the Intestines, and perfectly cured his Patient. See his *Treatise on the High Operation*, pag. 180. and his *Anatomy*, 3d edit. pag. 283.

How concealed Wounds of the Intestines are to be treated.

IV. But what Assistance are we likely to receive from Clysters in Wounds of the Intestines? Some Physicians are very high in their Commendation, whilst others, of equal Credit, absolutely prohibit the Use of them. For my own Part, I see no Reason for carrying either Prejudice to so great a Length. The Use of Clysters is very prudently forbid in Wounds of the great Guts, but no less Judgment is shewn in prescribing them in Wounds of the small ones. In the first Case, the Clyster will make its Way through the Wound, into the Cavity of the Abdomen, to the great Detriment of the Patient; whereas in the latter, they will always prove beneficial. For the Inconvenience which attends the other, is prevented in this Case by the Valve of the *Colon*; and the Benefits that accrue from

Of Clysters in this Case.

this Application are very obvious: The useless Fæces are carried off, an equable Course of the Blood is restored, the Fever and Inflammation are much abated by it, if not entirely taken off, and the Pains greatly alluaged.

C H A P. VIII.

Of the FALLING DOWN of the OMENTUM.

Falling
down of the
Omentum.

I. IN large Wounds of the Abdomen, the *Omentum* will frequently protrude itself through the Wound, either alone or with some Portion of the Intestines. Whenever this is the Case, the Surgeon's first Inquiry is, Whether the protruded Part preserves its Heat, Moisture, and natural Colour? If it is not found faulty in any of these Circumstances, it must be gently returned: But where the Straitness of the Wound forbids this, the protruded Part must be taken off close to the Wound, and the Wound healed according to the common Form. The *Omentum* in this Case will adhere to the internal Part of the Wound, without bringing any Disorder upon the Patient. But where the Intestines fall out at the same time, the *Omentum* is to be fomented, by an Assistant, with warm Milk and Water, till the Intestines are returned, and then the *Omentum* must be replaced.

What is to
be done
when the
Omentum is
corrupted.

II. If any Part of the protruded *Omentum* is cold, dry, livid, mortified, or putrid, the discoloured corrupted Part must be entirely cut off before the rest is returned; lest the neighbouring Parts should be brought into consent, which would inevitably prove fatal to the Patient. GARENGEOT would have the vitiated *Omentum* returned wholly into the Abdomen, without Ligature or Incision. But that this Procedure is wrong, I shall shew more fully in the following Numbers.

How the
corrupted
Part is to be
taken off.

III. The corrupted Part of the *Omentum* may be taken off in this Manner: Take a strong waxed Thread, pass it two or three Times round the sound Part of the *Omentum*, near the Place where it is injured, and fasten it with a Knot, to prevent any Hæmorrhage ensuing after the Reduction of it. When you have made a secure Ligature, take off the corrupted Part with the Knife or Scissors; and return gently what remains sound, leaving at least the length of a Foot of the Ligature hanging out of the Wound in the Abdomen, till it slips off from the sound Part of the *Omentum*.

How the
Wound is
to be dressed.

IV. What remains with regard to the Cure of the Wound is sufficiently treated of above at Chap. V, N. XIV. and the following Numbers. The depending Part of the Wound should be kept open with a large Tent, such an one as is described Plate II, Lett. O, that a Passage may be left for an Evacuation of the Sordes from the Cavity of the Abdomen. It will be proper to give two different Colours to the Thread that hangs from the Tent, and that which belongs to the Ligature of the *Omentum*, to prevent Confusion, as we advised above, Chap. VI, N. V.

How the
Thread is to
be drawn
out.

V. At every Dressing, after the first six or seven Days, you may draw the Thread which hangs out of the Abdomen gently forwards, till it shall by Degrees slip quite off the *Omentum*. But this should be done without any Violence. When the Thread is drawn out, and you can perceive no Discharge from the Cavity of the Abdomen, you may remove the Tent, and use proper Means to heal

heal the external Wound. After which you should take away some Blood, unless there has been a sufficient Discharge before; and recommend Rest and Abstinence to the Patient.

VI. What shall we say to the unwarranted Opinion of DIONIS? who advises Surgeons never to take off any Part of the *Omentum*, but rather to follow the Example of MARESCHALL, *first Surgeon to the French King*, who, according to our Author's Account, has very frequently returned the *Omentum* without making either Ligature or Incision, and never saw any bad Consequence from this Practice. But I will venture to pronounce this Relation of DIONIS's to be very faulty, and not delivered with that Accuracy which is required in a Matter of Fact of this Consequence. We cannot learn, by this Account of his, whether the *Omenta*, which were returned in this Manner by MARESCHALL, were large or small, whether they were entirely sound, or corrupted in part. If they had received no Injury, DIONIS spends his Time idly, when he so earnestly entreats all Surgeons to follow the Steps of MARESCHALL in this Point: No body ever advised the contrary. But if they were in part corrupted or mortified, which DIONIS does not assert, it is much to be admired that the Patients felt no Inconvenience from this Practice; and what became of the corrupted Parts after they were returned, is to me Matter of great Wonder. Therefore DIONIS is by no means to be attended to upon this Point, till he speaks to it in a clearer Manner: And more particularly so, because PALFYNNUS gives us the History of a Case, in his Surgery, where MARESCHALL made a Ligature and Incision upon the *Omentum*, and separated the corrupted Part from the sound, before he returned it: And this he declares to be the Practice of Surgeons of the first Name in PARIS.

VII. GARENGEOT declares himself of the same Sentiments with DIONIS, though he makes no Mention of his Name. This Author is far from being clear in describing how large a Portion of the *Omentum* was affected, which MARESCHALL, or any other, returned, without Injury to the Patient. I do not deny but that a very small Portion of the *Omentum* may be digested in the Abdomen without bringing on any considerable Mischief: But I can by no Means be persuaded that this can ever be the Case, when a large Portion of the *Omentum* is affected, except I should be confronted with many Instances of it. If by chance one Instance should be produced, this will not put the Matter out of doubt, much less serve as an Example worthy of Imitation. For miraculous Events happen now and then in very dangerous Wounds: And since grievous Symptoms are brought on by letting Sordes remain even in external Wounds, what may we not fear from the same Incident in internal Wounds, from whence they cannot possibly be discharged? A large Degree of Suppuration is to be expected when a large Portion of corrupted *Omentum* is returned into the Body: But when a Ligature is made upon the *Omentum*, and the corrupted Part separated from the sound, no such Accident can happen. The Suppuration in this Case will be very inconsiderable, and the small Quantity of Matter that is made after Reduction, will be easily discharged through the external Wound that is kept open for that Purpose by a Tent: Whereas GARENGEOT forbids the Use of Tents promiscuously (which this very MARESCHALL used with great Success) and advises you to heal the Wound as soon as possible. I am of opinion, therefore, that you should very carefully distinguish between a great and small Degree of Suppuration, because this is of greater Consequence than GARENGEOT seems

DIONIS's
Advice in
this Case.

GARENGE-
OT's Advice.

seems to imagine. Since this Matter is left doubtful, and GARENGEOT no where pretends to have had Experience of the good Effects of the Practice which he espouses; but on the other hand, PALFYNUS, who was an Eye-witness, contradicts him; I think we may very safely imitate the Examples of many excellent Surgeons, in making a Ligature upon the *Omentum*, and separating the corrupted Parts of it from the Sound, before we attempt to return it into the Abdomen.

C H A P. IX.

Of WOUNDS of other Parts of the ABDOMEN.

IF you can discover by your Eye, or by the Touch, that any other Part or *Viscus* situated in the Abdomen, suppose the Liver, Spleen, or Kidney, has received a Wound from a sharp Instrument, it will be adviseable at the first Dressing, to fill the Wound as tenderly as possible, with a good Quantity of Lint, well saturated with high rectified Spirit of Wine, or Spirit of Turpentine, securing the Dressings with Compresses and Bandage: By this Means the Hæmorrhage will be stopped, if no large Blood-vessel is divided. But you must observe that the Lint be not removed at the first Dressings; it should remain till it drops off of itself. When you have gained this Point, the Wound may be treated according to the Rules we laid down for the Treatment of Wounds of the Abdomen. The rest must be left to God's Providence, and the Strength of the Patient's Constitution. During the Cure the Patient must be constantly kept still and low. If he is of a plethoric Habit of Body it will be proper to bleed him, to prevent Inflammation, and fresh Effusions of Blood; prescribing him also vulnerary Potions, and giving him daily two or three Doses of *Luca-tellus' Meibomius's Balsam*: For these Balsams are of great Efficacy in healing internal Wounds. In hidden Wounds of the Viscera, that are not to be discovered by the Eye or by Feeling, all you can do is to take proper Care of the external Wounds, daily injecting a vulnerary Decoction, and keeping open a free Passage for the Evacuation of grumous Blood and Matter from within, ordering the same Regimen to be observed both with regard to Medicine and Diet, which we advised above, and leaving the rest to Nature, for Art can give no further Assistance.

EXPLANATION of the FIFTH PLATE.

Fig. 1. Describes a blunt Iron Needle, to pass a fine Rag or Skein of Silk, well saturated with proper Balsams or Ointments, through *Gun-shot*, or other *pervious Wounds*, after the Manner of a *Seton*.

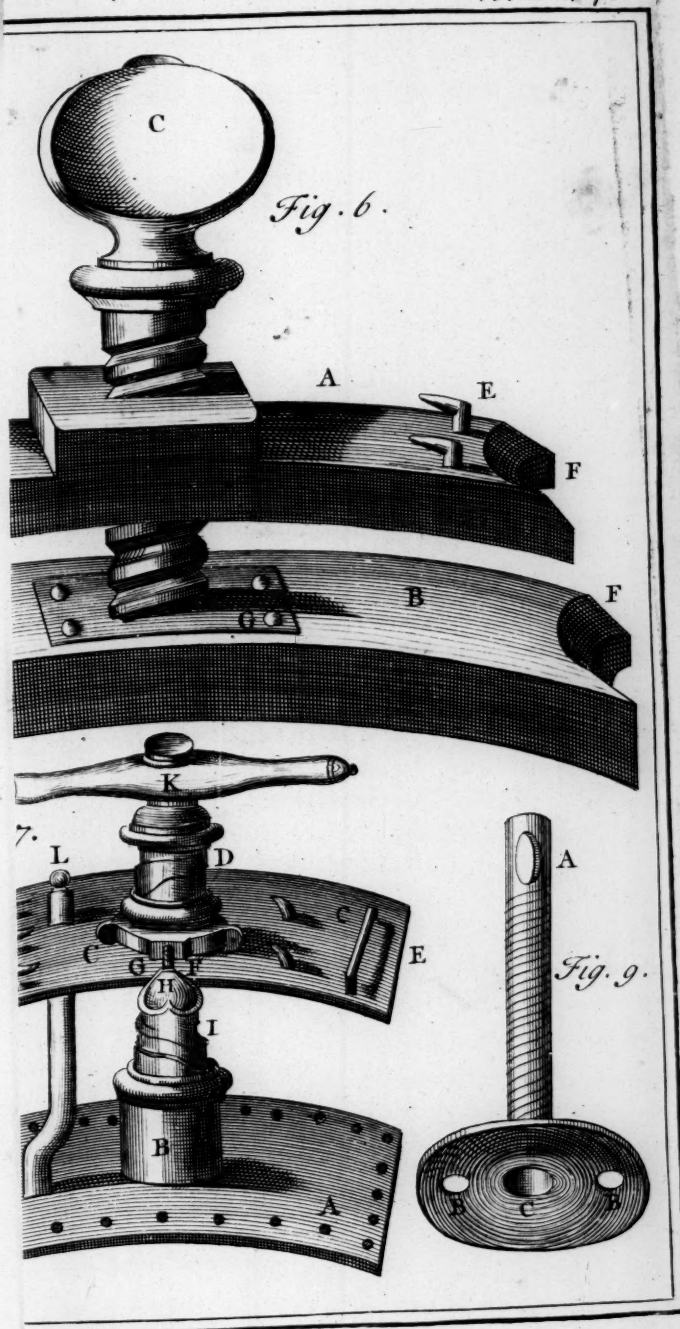
Fig. 2. An Instrument to stop the Blood in Wounds of the large Arteries, described in *Ch. II. § VIII.* from our Amendment.

AA, A Brass Plate somewhat bent.

BB, A strong Brass Screw.

C, A round Plate of a Thumb's Breadth to be fixed upon the Wound.

D, The



ends of
Breast of
e Sorts.

w to dif-
er whe-
r the
und is
minated
the exter-
Parts.

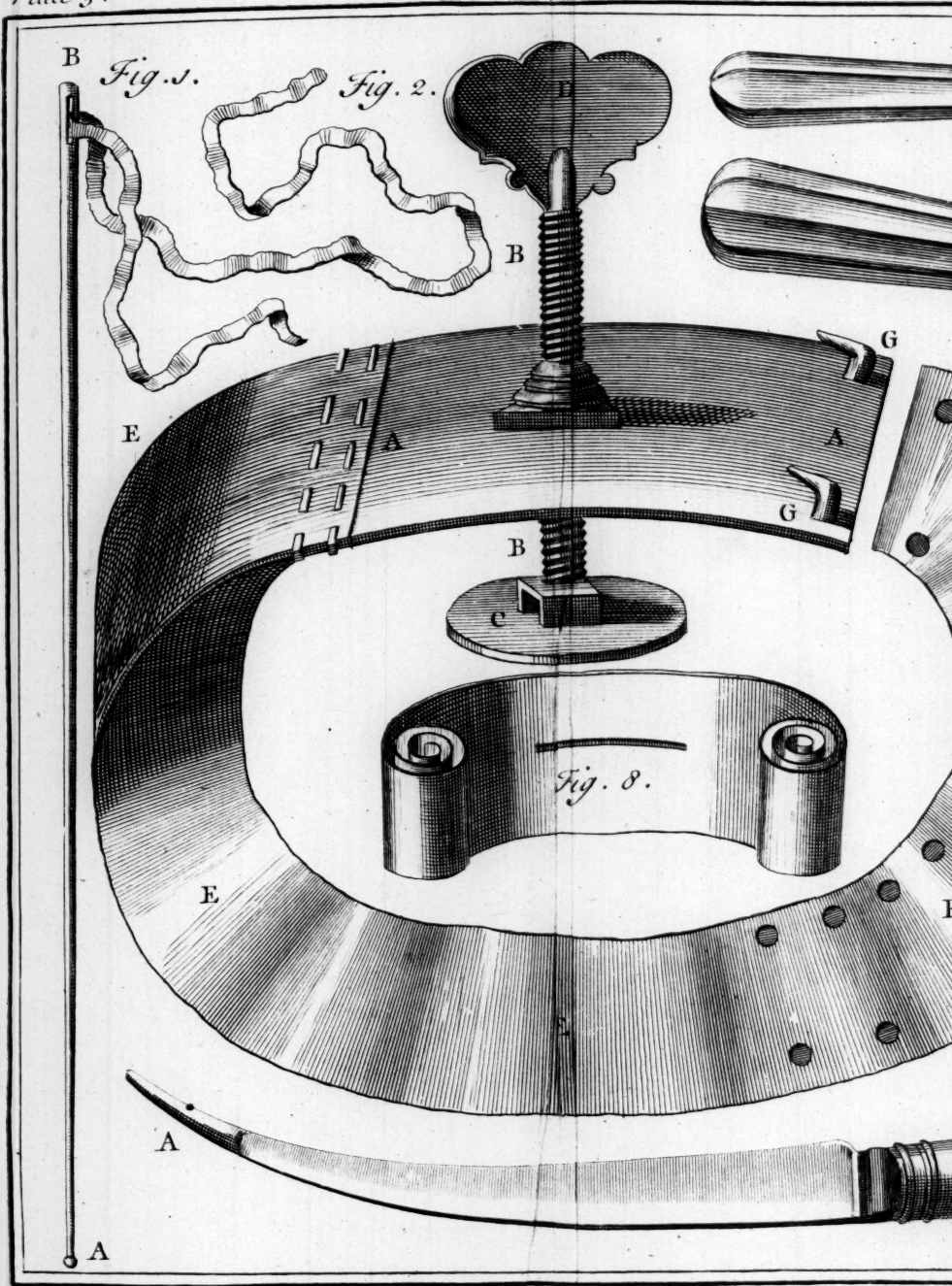


Fig. 4.



Fig. 5.



Fig. 6.

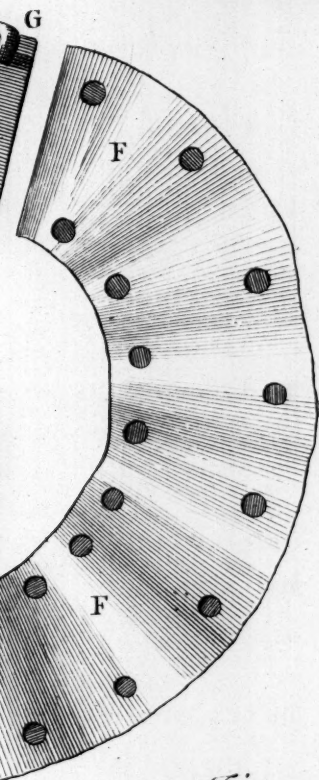
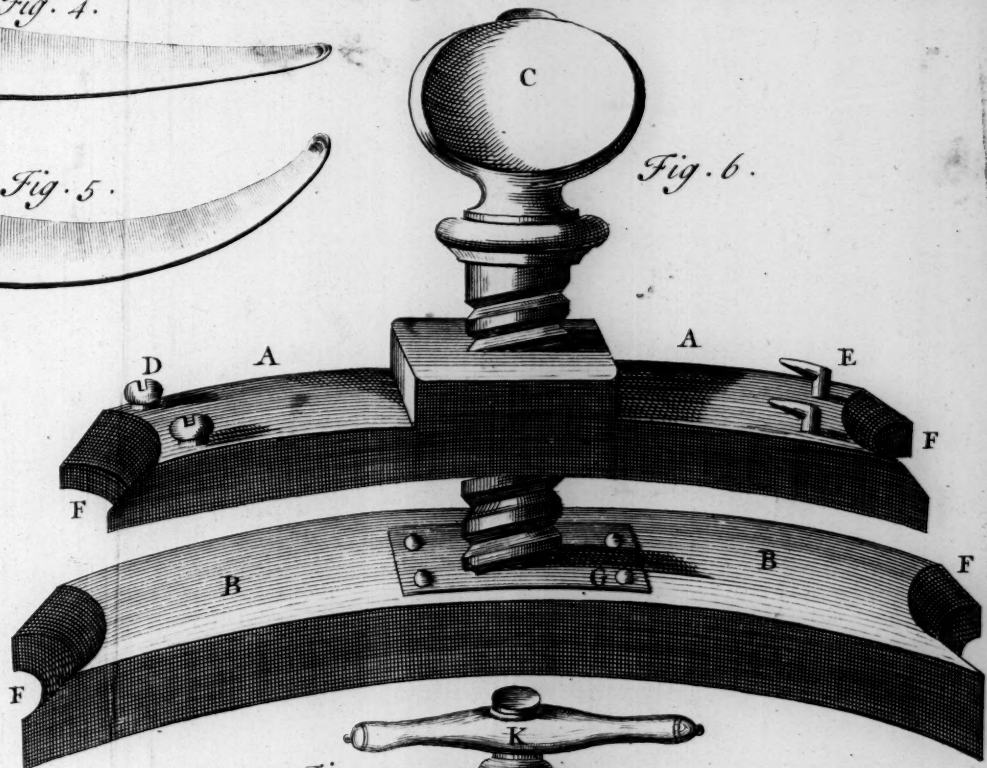


Fig. 3.



Fig. 7.

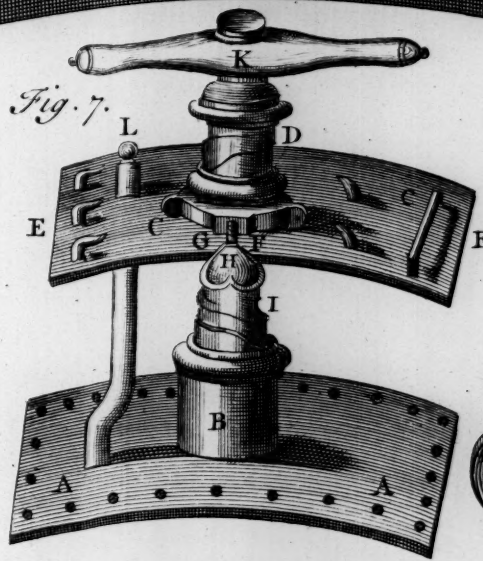


Fig. 9.



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D. The Button which turns the Screw, and presses the Plate C strongly upon the Wound.

EE, A strong Leather Belt to surround the wounded Part.

FF, Part of the Belt pierced with several Holes, by which it may be fixed upon the Hooks G G, and lengthened or shortened according to the Size of the Limb.

Fig. 3. A crooked Knife, with a round blunt Point, to enlarge Wounds of the Thorax or Abdomen, where that Operation is required.

Fig. 4. A strait Knife with a Button on the Point.

Fig. 5. A crooked Knife with a blunt Point.

Fig. 6. A wooden *Tournequet* in its proper Size, to stop Effusions of Blood, after our Amendment described above at Chap. II, § XII.

AA, The upper Part.

BB, The lower Part.

C, The great Screw.

D, Two small Iron Screws, to which a Leather or Silk Belt is to be fixed.

E, Hooks to fasten the other End of the Belt on, when it is brought round the Limb.

FF, The Ends of the upper and lower Part of the Instrument hollowed to receive the Belt, and to keep it steady in its Situation.

Fig. 7. Another kind of *Tournequet* made of Iron; the Description is left by half than the proper Size of the Instrument. See Chap. II, § XIV. where it is largely treated of.

Fig. 8. A broad Bandage, called the *uniting Bandage*; this is perforated in the Middle, and rolls up with two Heads; it is used in dressing Wounds of the Abdomen, which are made lengthways.

Fig. 9. A flexible Silver Pipe, useful to discharge the Matter which is collected in Wounds of the Thorax, or in the *Empyema*.

A, The Openings at the Extremities, and on both Sides.

BB, The Plate round it, with two Holes to pass a Thread through.

C, The Passage that goes through the Pipe to A.

CHAP. X.

Of WOUNDS of the THORAX.

I. **W**OUNDS of the *Thorax*, as of the Abdomen, are divided into three sorts. The Wound is inflicted either upon the external Parts of the *Thorax* only; or else it penetrates into the Cavity of the *Thorax*, without injuring any of its Contents; or lastly, the Contents of the *Thorax* also partake of the Wound.

Wounds of the Breast of three Sorts.

II. You may discover that the Wound terminates in the external Parts, and does not penetrate into the Cavity of the *Thorax*, by several Methods. 1. By the Sight. 2. By the Sense of Hearing, by which you will discover whether any Sound proceeds from the Wound at the Time of Inspiration. 3. By Feeling, when

How to discover whether the Wound is terminated in the external Parts.

when your Finger or the Probe meets with Resistance, if you attempt to pass it into the Cavity of the *Thorax*. 4. By injecting warm Water, which in this Case will return strongly upon you. 5. By the Absence of bad Symptoms, such as Difficulty of Breathing, Fainting, sick Fits, &c. which always attend a Wound that penetrates. When by these Methods of examining you are fully satisfied that the Wound does not penetrate, you may dress it with a digestive Ointment, or some vulnerary Balsam, and treat it according to the Methods which we have advised above for the Cure of slight Wounds.

What deep
and oblique
external
Wounds of
the *Thorax*
occasion.

III. It sometimes happens that external Wounds run very deep and obliquely between the Muscles and the Ribs, and are thereby rendered very difficult to be cleansed from grumous Blood and Matter. The confined Matter in this Case frequently destroys the neighbouring Parts, and produces Ulcers and incurable Fistulæ: Nay, sometimes it makes its Way through the *Pleura* into the Cavity of the *Thorax*, and forms an *Empyema*, or brings on a *Phthisis*, or Death itself.

How they
are to be
treated.

IV. The Surgeon's chief Business in this Case is to clear the Sinuses from the Blood and Matter confined in them. This is to be done either by Pressure, or by ordering the Wound to be sucked by an healthy Person; by drawing it out with a Syphon, or by making further Openings with the Knife. The rest of the Cure is to be performed after the same Manner which we described above, N. II. The most proper Bandage for securing the Dressings is the scapulary with the Girdle. See Plate III, Fig. 1. Which Bandage must be easy, that the Blood, or Matter, confined in the Wound, may have the freer Vent.

How to
empty the
Wound with
a Syringe.

V. The *Syringes* that are used in this Case are of very different Shapes and Sizes; some are strait, others crooked. Some Surgeons use a Tin Syringe, resembling that which we have described at Plate VI, Fig. 8. but twice as large: The Mouth of it is larger than the rest of the Syringe, and is of a triangular, round, or oval Figure. Fig. 9. represents the true Size of it. When you apply this Instrument, you must clap the Mouth of it to the Wound, and by drawing back the Handle, endeavour to fill it with Blood. The Instrument should have several Heads of different Sizes and Figures, that it may correspond with any sort of Wound. But, concerning the Excellency and Use of these Syringes, it will be worth your while to consult ANELLE, in his Treatise called *l'Art de Sucrer les Playes*.

How to dis-
cover if the
Wound pe-
netrates the
Cavity.

VI. You will discover the Wound to penetrate into the Cavity of the *Thorax*; 1. By the Sight, when you can plainly see into the Cavity. 2. By the Sense of Feeling, when you can pass your Fingers or Probe into the Cavity. 3. By the Hearing, if the Patient makes a particular sort of Noise in drawing his Breath. 4. From the Action of the Air of the Lungs upon the Flame of a Candle, or Feathers, when they are held near the Mouth of the Wound. 5. By warm Water meeting with no Resistance, when it is injected into the Wound. 6. Lastly, from the sudden Appearance of violent Symptoms, such as Difficulty of Breathing, Sickness, Fainting, &c. which are brought on by the Pressure which the Lungs are sensible of from the external Air, from a Collection of Blood in the *Thorax*, or from both Causes together.

VII. When

VII. When a large Quantity of Blood is spilt, and falls into the Cavity of the *Thorax* (which must sometimes be the Case) the Expansion of the Lungs, the Office of Respiration, and the Course of the Blood through the Lungs will certainly be impeded; and the Blood by frequent Delays and Obstructions being entirely inspissated in the Lungs, Life can no longer be supported. But where the Quantity of extravasated Blood is not large enough to obstruct the Lungs in their Office, the chief Danger that the Patient labours under is, that the extravasated Blood should putrify by Degrees, and corrupt the Diaphragm, Pleura, or Lungs; which will bring on very bad Symptoms, and in a short Time Death.

What proceeds from a Collection of Blood in the *Thorax*.

VIII. The following Symptoms discover an Extravasation of Blood in the *Thorax*. If, 1. There is a great Difficulty of Breathing, except when the Patient is placed in an erect Posture. 2. If the Patient lies easiest upon his Back or wounded Side, but finds any other Posture exceeding troublesome, or sometimes impracticable. 3. If he feels a Weight upon the Diaphragm. 4. If he perceives the Undulation of a Fluid upon turning the Body round. And, 5. lastly, If there has been little or no Discharge of Blood from the Wound.

Symptoms of extravasated Blood in the *Thorax*.

IX. When it appears by these Symptoms that there is a Collection of Blood in the *Thorax*, we must use our utmost Diligence to get it out, lest it should lay a Foundation for great Mischief. Therefore, 1. When the Wound is inflicted upon the Middle, or lower Part of the *Thorax*, and has not a very narrow Opening, it will be convenient to lay the Patient upon the ^a wounded Side, advising him to fetch his Breath as deep as he can, or to cough. If the current of Blood is obstructed by any thick grumous Parts, which will sometimes stop up the Orifice of the Wound, they must be removed with your Finger, or with the Probe, or drawn out with a Syringe, or by Suction. 2. If you are called so late that the Blood is become too thick to flow out of the Wound, you will be obliged to use an attenuating Injection; which may be made of a Decoction of Barley, with the Addition of some common Honey, or Honey of Roses, and a small Quantity of Soap; this is to be injected, not over-warm, into the Cavity of the *Thorax*, and then the Patient is to be so situated as to let it run out again. This Operation is to be repeated till it appears that all the grumous Blood is washed away. The Syringe, which you will see described in *Plate VI, Fig. 8.* with the Pipes, *Fig. 10, 11.* will execute this Intention very properly. 3. But if the Wound is so narrow or oblique that this Method cannot be prosecuted, it should be enlarged, either with the common Incision Knife and Director, or with one of the Knives described at *Plate V, Fig. 3, 4, 5.* This Caution is always to be observed, that is, to be very careful not to fatigue the Patient too much, by endeavouring to discharge all the extravasated Blood at one Time. If the Patient is very weak, it is better to do it at proper Intervals, especially if you discover any Tendency in him to Swoonings. It will be necessary in the mean Time to keep the Wound open by the introducing a Lead or Silver Pipe into the Wound, such as are described at *Plate II, Lett. Q, R, S,* or rather that flexible one at *Plate V, Fig. 9.* Though some, instead of a Pipe use a Tent with a long String at the End of it, dressing up with pro-

How to get the Blood out of the *Thorax*.

^a DIONIS, in his *Surgery*, relates a Case of this Kind, where he left his Patient all Night inclined upon the Wound without dressing him, and he afterwards recovered him. DE LA MOTTE confirms this by an Instance he gives us of the same Kind, that occurred to him in his Practice. See his *Observationes Chirurgicae*.

per Plasters and Compresses, securing the whole with the Scapulary, repeating this Method of dressing till the Discharge shall entirely cease, and the external Wound can be conveniently healed.

How the
Blood is to
be discharged
when the
Wound is in
the upper
Part of the
Thorax.

X. When a Wound is made in the upper Part of the Breast, or between the upper Ribs, then the Method we have prescribed of turning the Patient upon the wounded Side, will be of very little Service in discharging the extravasated Blood; for no Posture will satisfy this Intention in this Case but standing upon the Head. In this Case, if no Relief is to be expected from the Syringe or from Suction, an Opening should be made in the lower Part of the *Thorax*, which Operation the Surgeons call the *Paracentesis*. The Opening must be between the second and third Rib, counting upwards, if it is on the Left Side; but on the Right Side, between the third and fourth, about a Hand's Breadth from the Spine. The Place where you intend to make the Opening should be marked with Ink. The Instrument that is generally used upon this Occasion is called a *Trocar*: It should be driven above the Rib into the *Thorax*, with great Caution and Gentleness. After it has penetrated, draw out the Steel Instrument, leaving in the Pipe through which it was conveyed, as a Channel for the Blood to pass off by: But if it does not readily pass, its Evacuation may be forwarded by Suction, or a Syringe. But as the Lungs are very liable to be wounded by passing this Instrument forcibly into the Cavity of the *Thorax*, it is best, in my Opinion, to divide the common Integuments, the Intercostal Muscles and Pleura, with an Incision Knife, carefully avoiding the Lungs, which are very apt to adhere to the Pleura in this Part. When the Perforation is properly made, it is to be kept open in the Manner we have already shewn, and the Wound above is to be healed as soon as possible.

What is to
be done when
the Lungs
adhere.

XI. As the Lungs frequently adhere to the Pleura, the Perforation of the *Thorax* requires great Circumspection in the Surgeon. The Pleura should be divided with all possible Tenderness; and when that is done, the Surgeon should examine whether the Adhesion of the Lungs may not safely be removed with his Fingers or the Probe. When the Adhesion is very firm, the Pains we have taken to perforate the *Thorax*, and to discharge the extravasated Blood, all prove fruitless. We must in this Case make an Incision in another Part, either before, or on one Side; and proceed as above.

How
Wounds of
this kind are
to be treated.

XII. The Cavity of the *Thorax* being thus cleansed, the Wound is to be dressed but once every Day: Each Dressing should be performed with all possible Expedition, and the utmost Diligence should be used to guard the Contents of the *Thorax* from the external Air. At the Time of dressing, a Chafing-dish of hot Coals should be held near the Wound to warm and thin the Air; and if too great a Quantity of Air is already got into the Cavity of the *Thorax*, it must be drawn out with a Syphon. This being rightly performed, the Wound is to be dressed up with the utmost Expedition.

If any of the
Contents of
the *Thorax*
are wound-
ed.

XIII. When any of the Contents of the *Thorax* are wounded, as the Heart, the Aorta, the Vena Cava, the Pulmonary Artery or Vein, the Oesophagus, Thoracic Duct, the Mediastinum, or a large Portion of the Lungs (especially if it is a Gun-shot Wound) Death comes too suddenly to give the Surgeon Room to exercise his Art. On the other hand, when the Lungs are only slightly wounded, that is, when only the smaller Ramifications of the Pulmonary Vein or Artery, or the Aspera Arteria are divided, the Case is very dangerous, but

but not always mortal. Though Persons who recover after Wounds of this Kind, are more obliged to the Soundness of their own Constitutions, than to their Surgeon's Skill.

XIV. We may reasonably apprehend that the Lungs are wounded, when the Patient voids a great Quantity of frothy Blood by the Mouth, accompanied with a Cough, especially when at the same Time the Blood which is voided at the Wound is very florid, and the Patient makes a particular Noise when he draws his Breath. The Office of the Surgeon here seems to be to clear the internal Part of the *Thorax* from the extravasated Blood, and to heal the external Wound: The Methods of doing which, we have already explained. No Application can be made to the internal Wound: That must be left to Nature. Whenever the divided Vessels contract themselves, and the Blood stops of itself, the Patient will recover: Though Persons who have recovered from these Wounds are remarkably subject to Ulcers of the Lungs and Consumptions. Whenever any of the larger Pulmonary Vessels are divided, the Violence of the Hæmorrhage either brings present Death with it; or, if it ceases a little, it returns again, and comes to the same End by slower Paces. To prevent this as much as possible, it will be proper to keep the Patient quite still for several Days, he should scarce speak, he should take cooling and agglutinating Medicines, and avoid all sharp Things, all that heat the Blood, or provoke Coughing; and, if his Strength will permit it, he should lose Blood by the Arm.

Signs of a
Wound in
the Lungs.

XV. Sometimes the wounded Part of the Lungs pushes forward, and sticks pretty firmly in the Orifice of the external Wound, as FONTANUS, TULPIUS, and RUYSCHE have observed in their Writings. In this Case, if it is forced back again, it will discharge a great Quantity of Blood into the Cavity of the *Thorax*: Therefore it is better to let it remain in the Situation you shall find it, for by this Means it will admit of the immediate Application of proper Dressings, and you may safely encourage it to adhere to the Lips of the external Wound. And here the Patient must be strictly admonished to keep as still as possible. But if a wounded Portion of the Lungs should be pushed out of the *Thorax* beyond the Limits of the external Wound, you should wrap a Piece of fine Linen round this Part, and make a Ligature above the Linen, taking off all that is below the Ligature with the Knife, and returning the sound Part of the Lungs into the Body, keeping one End of the Ligature constantly hanging out at the external Wound. When you have proceeded in this Manner, keep the Wound open with a Tent, till the Ligature can safely be drawn out. How the external Wounds should be treated we have sufficiently explained already.

Of the push-
ing out of
the Lungs.

XVI. As to the Medicines which are to be prescribed for internal Use, they consist chiefly, after the Hæmorrhage is over, of vulnerary Decoctions, giving at due Distances of Time a Dose of *Balsamum Lucatelli, vel Meibomii*, observing particularly a strict Regulation with regard to Diet. By following these Rules a Surgeon may sometimes save a Patient that has received a Wound of this Kind, at least, where it was impossible to perform a Cure, he will have the Satisfaction of having done his Duty.

What Inter-
nals are to be
given.

* HILDANUS, *Cent. II. Obs. 3.* relates a Case of this Kind, where a Portion of the Lungs forced its Way through a Wound of the *Thorax*; and Part of it appearing black and corrupted, he took it off with a red hot Knife, and then forced the sound Part back again into the Body. The Patient, he tells you, survived this, and recovered a perfect State of Health.

EXPLANATION of the SIXTH PLATE.

Fig. 1. A Brass *Tournequet* after PETIT's Manner, but with some Alterations: The Use of this Instrument, and Method of applying it, will easily appear, if you compare it with what we have said above in *Chap. II. Of Wounds.* § XV. and afterwards in the *Explanation of the fourth Plate, Fig. 2, and 6.*

Fig. 2. A Handle to fix Needles in when you are to make Sutures: This the French call *Portaiguille*.

Fig. 3. Another of the same Sort from GARENGEOT.

Fig. 4. PETIT's Handle for Needles.

Fig. 5. A Needle to perform *Gastrotomy*.

Fig. 6. Another of a larger Size.

Fig. 7. Another, which is new, to perform the same Operation.

Fig. 8. A Syringe for various Uses, furnished with Pipes of different Sorts; by the Help of this you may not only inject Fluids into Wounds of the Abdomen and Thorax, into the Fauces, into Abscesses, Ulcers, and into the Uterus; but you may also by the Assistance of this Instrument draw extravasated Blood from the Cavity of the *Thorax*, in which Case the Syringe should be twice as large; the Mouth of the Pipe A should be triangular, and about two Thumbs Breadth.

Fig. 9. Another Pipe with a round Mouth, intended for the same Uses.

Fig. 10. A smaller Pipe, which may be fastened to the Syringe, Fig. 8. for various Uses.

Fig. 11. Another somewhat curved, and perforated on both Sides: This will serve to suck Blood out of the Cavity of the *Thorax*, and to throw Injections into that Part, or into the Fauces.

Fig. 12. Another, perforated at the End like a Cullender.

Fig. 13. Another like the former, but curved, to throw Injections into the Uterus, and for other Uses.

Fig. 14. An Iron Instrument like an Ear-picker, for various Uses.

C H A P. XI.

Of WOUNDS of the NECK.

Wounds of
the Neck of
bad Conse-
quence.

I. **W**OUNDS of the Neck are no less dangerous than those of the *Thorax* or *Abdomen*; insomuch, that I am surprized to find several Chirurgical Writers treat of Wounds of this Class slightly, as if they were scarce worthy of their Notice. And I have often wondered, and complained of it in my *Anatomy*, (Sect. 264.) that in the Division of the Trunk the Neck should be omitted.

How many
Kinds of
Wounds of
the Neck.

II. There are several Sorts of Wounds in the Neck. Sometimes the Seat of the Wound is only in the common Integuments, and the muscular Flesh: This is attended with very little Danger: But the most dangerous, and indeed generally incurable Wounds, are those of the larger Blood-vessels in these Parts: Such are those of the jugular Veins, carotid and vertebral Arteries; or where the *Aspera Arteria* is wounded; or the *Gula*; the *Medulla Spinalis*; the Nerves that

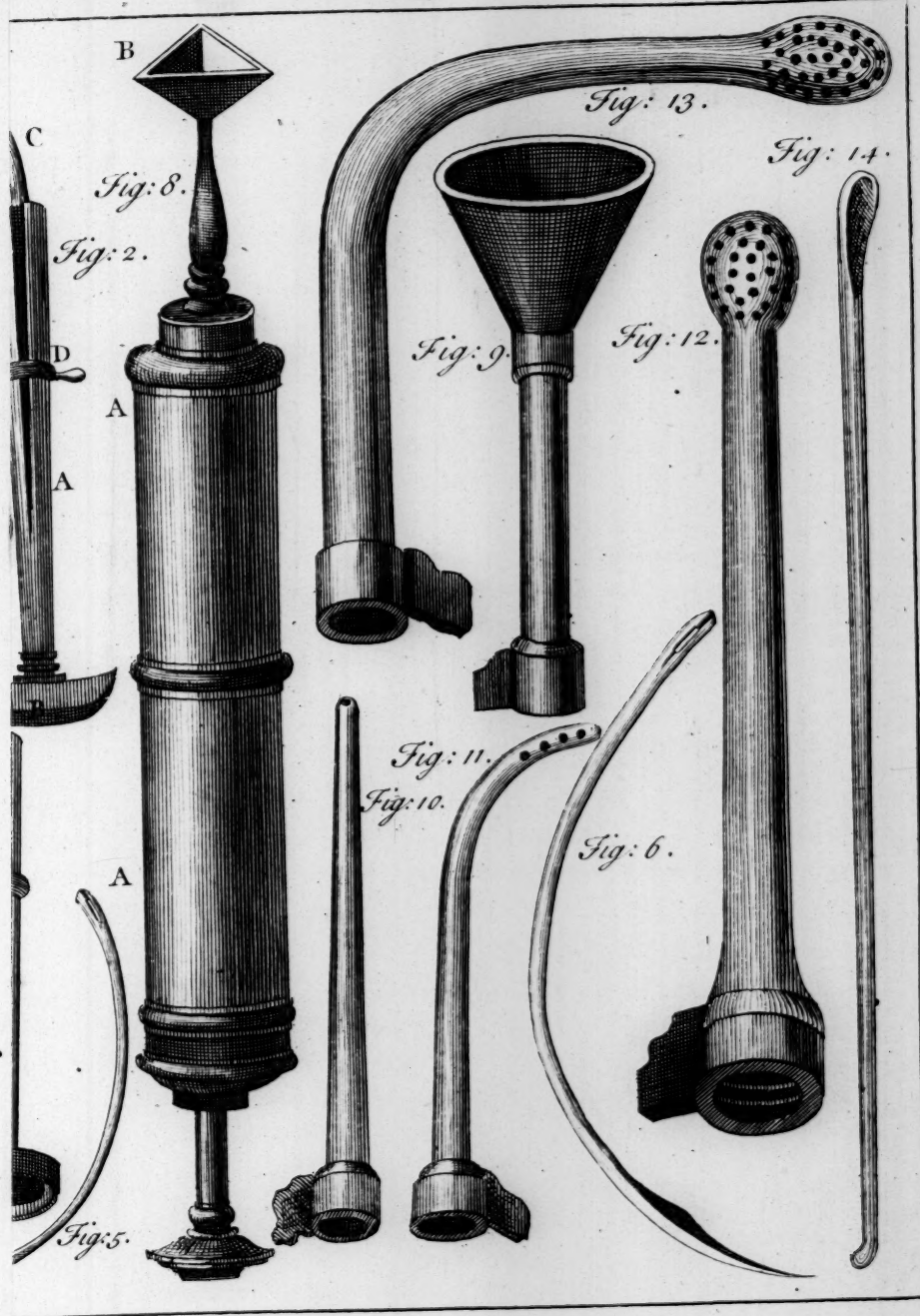


Fig: 5.

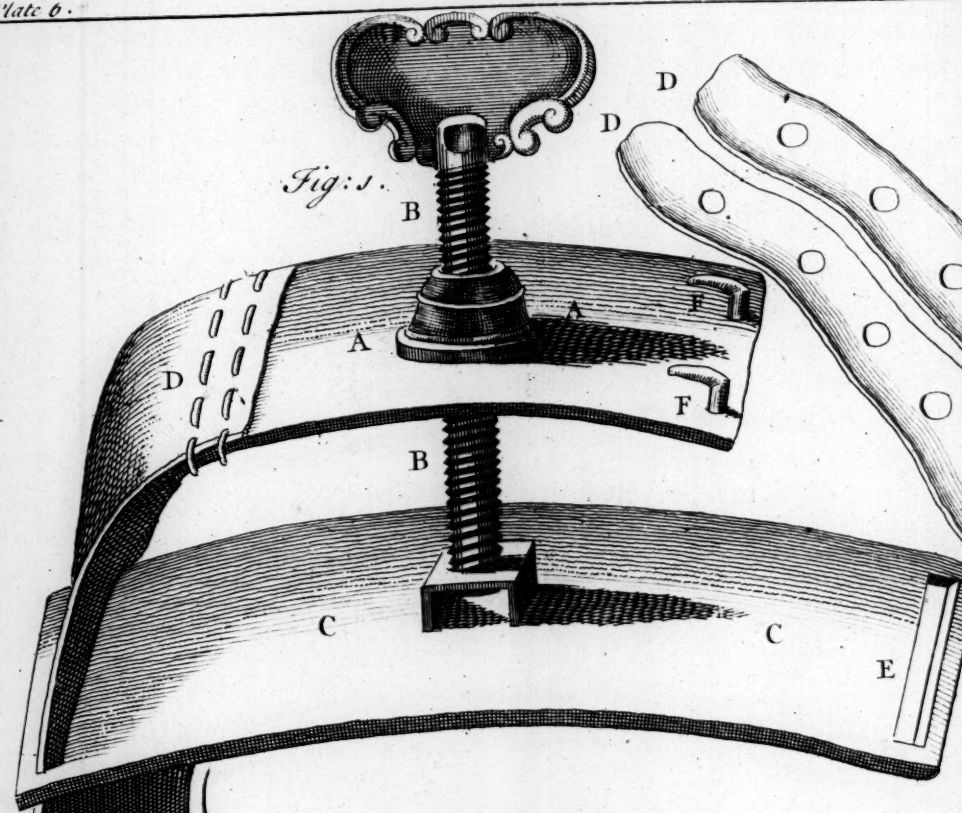
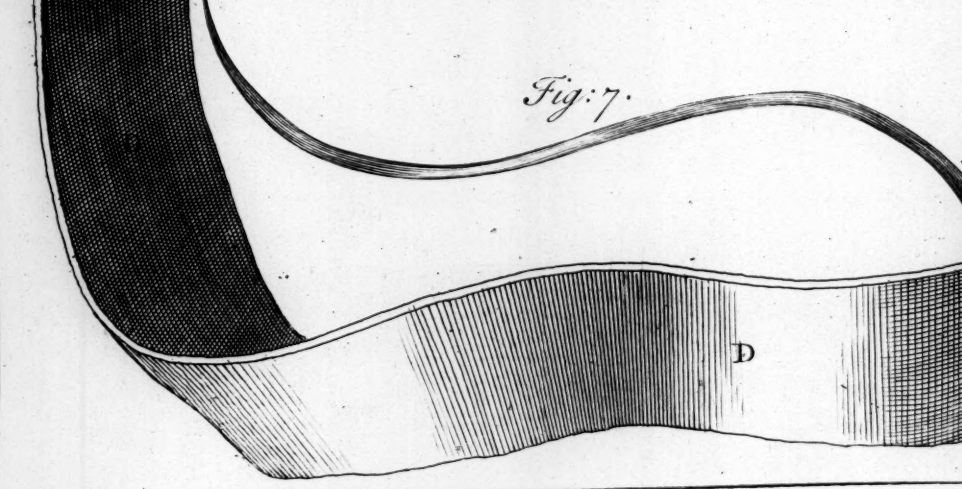
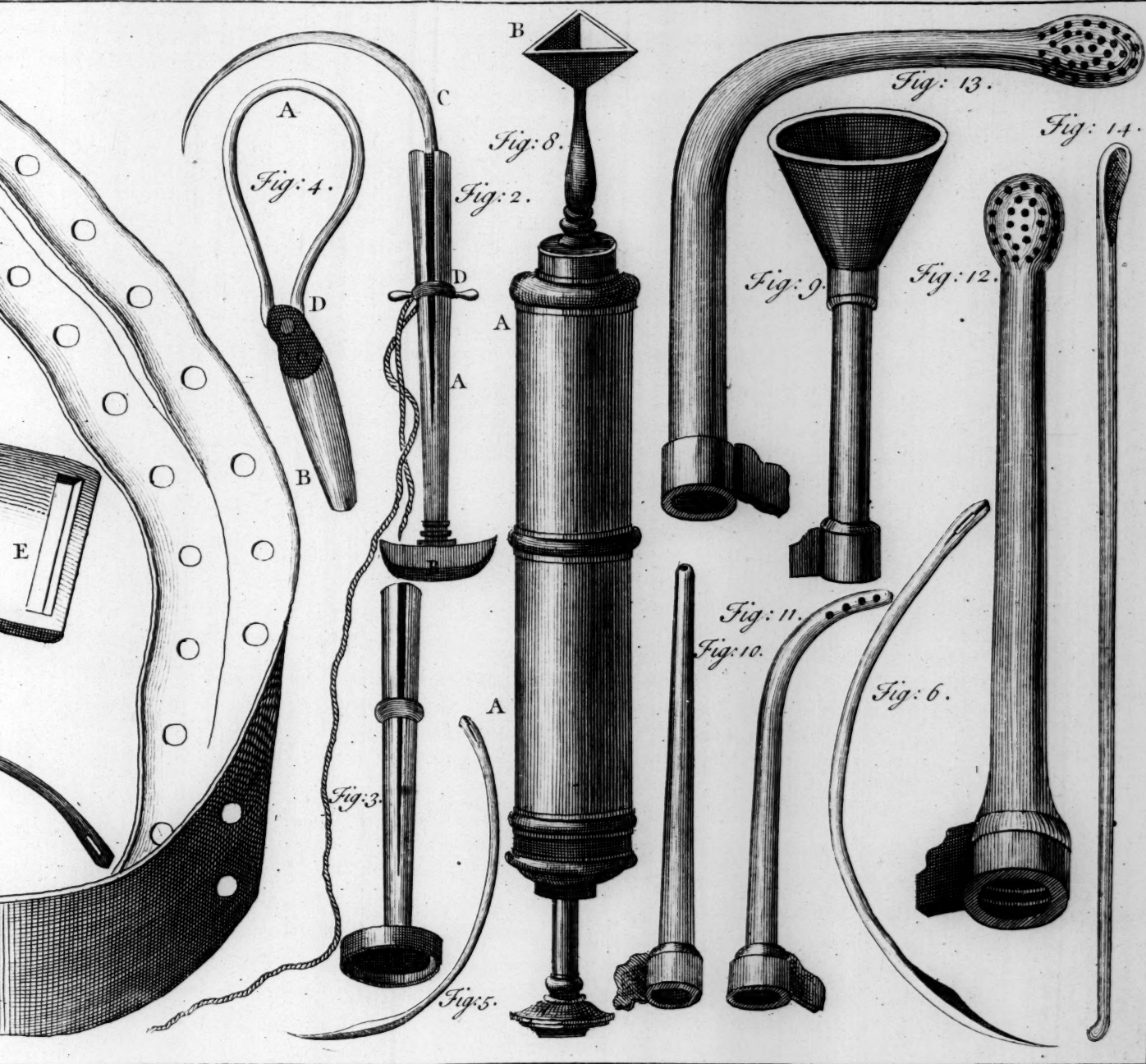
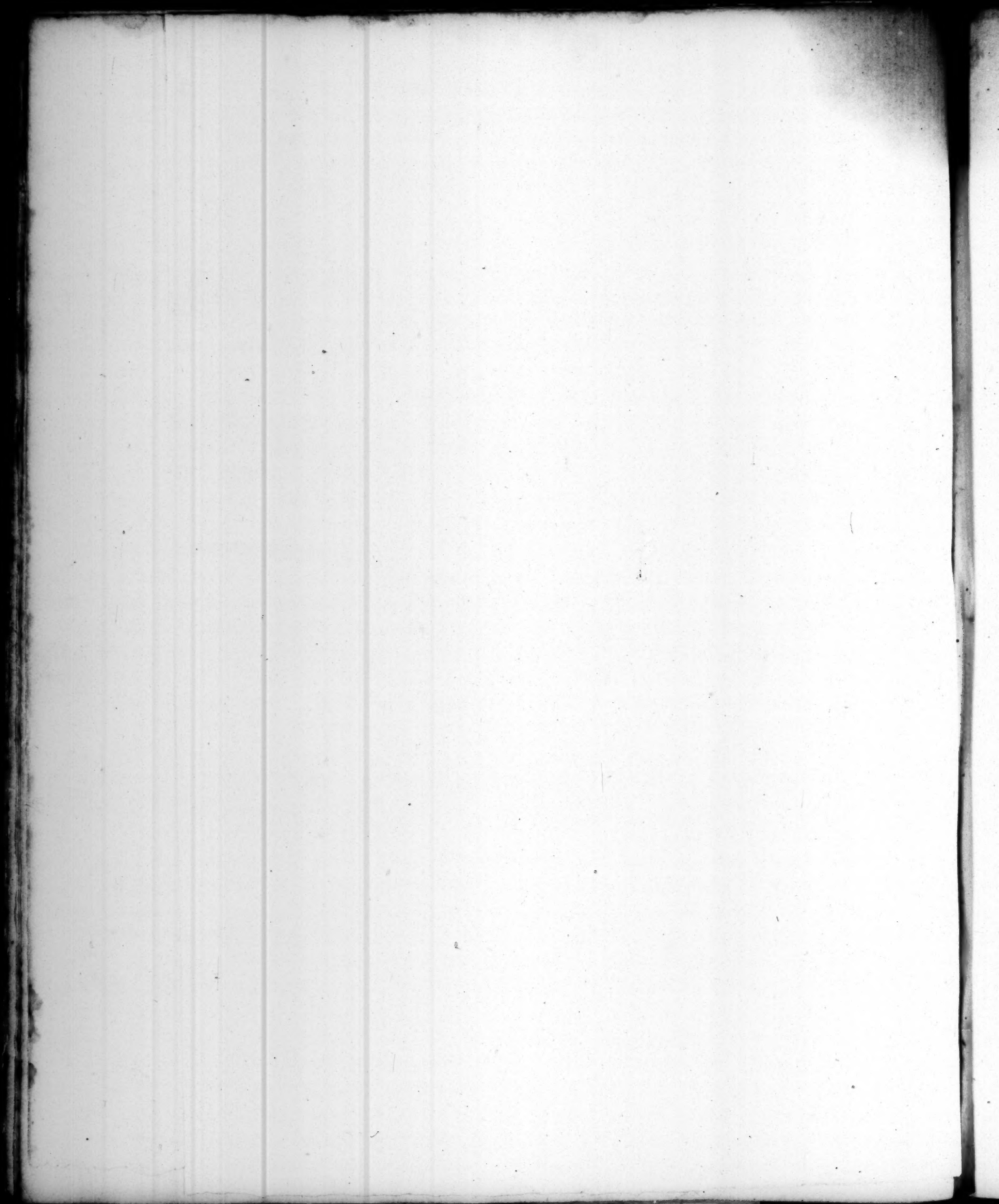


Fig: 7.







that descend by the Neck; (such as the Par Vagum, the Intercoftales, and the Diaphragmatici) or where feveral of thefe Parts are wounded at the fame Time.

III. You will eafily difcover with your Eye, or by confidering the Situation of the Wound, and the Symptoms that attend it, what Parts of the Neck are the Subjects of the Wound. After this Diagnostic, the Prognostic of thofe Wounds will eafily follow. For whoever is thoroughly acquainted with the Condition of a Wound, will find no great Difficulty in determining the Event of it. Where the common Integuments and Mufcles alone are wounded, you will have no reafon to dread any very ill Confequences. But where any of the other Parts of the Neck are Partakers of the Injury, you have reafon to apprehend the greateft Danger; becaufe moft of thofe Parts are abfolutely neceffary to Life itfelf: Though in this Cafe, where the Wound is fmall, there are fome Hopes of a Cure.

Diagnosis
and Prognosis.

IV. Wounds of the Arteries in the Neck are fcarce ever to be remedied, unlefs the Wound be very fmall indeed; for in this Cafe the Patient ufually bleeds to Death before a Surgeon can be called to his Affiftance: Though to fay Truth, if a Surgeon were prefent at the Inftant fuch a Wound was inflicted, all his Art and Induftry would have little or no Effect: For it is extremely difficult to flop Blood in this Part, not only from the Largenefs of the Arteries here fituated, and from their Vicinity to the Heart; but becaufe it is impoffible in this Place to make a fufficient Prefsure upon the wounded Veffel. Yet the Wounds of the external carotid Arteries, and the Hæmorrhages they occafion, are more eafily managed; efpecially if an experienced Surgeon be applied to in Time.

What happens after Wounds of the Arteries in the Neck,

V. A Wound upon the external Jugular Vein is not attended with much Danger, if a Surgeon is called in Time; for a fmall Degree of Prefsure is required here, as appears by the frequent Practice of Blood-letting in this Part. But Wounds of the internal Jugulars are extremely dangerous; and this partly from their Size, which is ufually larger than one of the Fingers; partly becaufe their Situation is fo deep, that no proper Application can reach them to any Advantage. For thefe Reafons many Surgeons have determined Wounds of this Kind to be mortal; but I can by no Means admit this as an abfolute Rule, without any Exceptions. On the contrary, I am of Opinion, that where the Wound in the internal Jugular is made by a fharp Inftrument, and but fmall, if a Surgeon is ready at hand, the Patient may be faved. How this is to be effected I fhall teach below.

After Wounds of the Veins.

VI. Wounds of the *Aspera Arteria* were ufually deemed mortal by Chirurgical * Writers: I am fo far from contradicting them in this Sentence, that I fhall rather endeavour to fupport it, that is, where the Wind-pipe is entirely divided, or wounded in its lower Part within the Cavity of the ^b Thorax, or joined with a Wound of the carotid Arteries or internal Jugulars, which is frequently the Cafe. But on the other hand, if it is only wounded in the fore Part, and the neighbouring Veffels remain unhurt, it is undoubtedly curable; which Opinion is ftrongly fupported by variety of Examples from my own Experience, and that of other Practitioners. See above *Cb. I. N. XIX.*

Wounds of the Aspera Arteria.

VII. There are very little Hopes of Recovery where the Gula is much wounded, or entirely divided; becaufe not only the Office of Deglutition is cut

Wounds of the Oesophagus.

* See BOHNIUS *de Vuln. Lethal.* Cap. ii. p. 23.

^b Ibid. Sect. II. Cap. iii. pag. 121.

off, but the Part is so situated, that it is almost impossible to wound it without injuring at the same Time some of the neighbouring Nerves and Blood-vessels. But when the Gula is the only Subject of the Wound, and the Opening is very small, the Wound may sometimes admit of a Cure.

Wounds in
the Medulla
Spinalis and
Nerves.

VIII. Wounds on any Part of the *Medulla Spinalis* are very dangerous, but more particularly so when inflicted upon that Part of it which passes through the Neck. Therefore it is no Wonder that scarce any one recovers after a considerable Wound of this Kind. The Reason of this will immediately appear, when we consider, that several Nerves proceed from this Part, which are absolutely necessary to conduct the Economy of the Animal; that the vertebral Veins and Arteries will almost always be wounded at the same Time; and that the Situation of these Parts is such, that it is impossible to convey the proper Remedies to them. Nor are Wounds of the large Nerves of the Neck, such as we mentioned at N. II. less dangerous than these: For if they are divided, the nobler Parts of the Thorax or Abdomen, to which Nature hath determined them, will immediately lose their Assistance, and of Consequence become unequal to the Offices for which they were intended.

How slight
Wounds of
the Neck are
to be treated

IX. The Treatment of Wounds in the Neck is different, according to the different Nature of the Wound. When the common Integuments and muscular Flesh are the sole Subjects of the Wound, it will require the same Method of Treatment which we have advised above for all slight Wounds, upon what Part soever they may be inflicted. Where the external Jugular is wounded, the same Methods which we use after bleeding in that Vein will be sufficient.

Cure of a
Wound in
the Internal
Jugular.

X. When the internal Jugular Vein has received a small Wound, the Hæmorrhage will easily be stopped by filling the Wound well with dry Lint, or steeped in *Alcohol. Vini*, or *Spirit. Terebinth.* or any proper styptic Medicine; or with the Fungus called *Crepitus Lupi*; laying over these Applications square Bolsters, and securing all with a Bandage, drawn as tight as the Situation of the Part will admit. An Hæmorrhage is much easier suppressed in a Vein than in an Artery: The whole of the Cure depends upon the Degree of Pressure that you can make upon the wounded Vessels. Sometimes it happens that the Method of dressing which we have just advised in this Case will have no Effect: When this shall happen, the Surgeon or his Assistant must keep his Finger constantly upon the Wound, or make a Pressure upon the Part, with such an Instrument as we described in *Plate V, Fig. 2.* till the Hæmorrhage is entirely stopped. This Pressure should usually be continued for a Day or two. The same Process should also be observed in Wounds of the vertebral Veins and Arteries. After the Blood is stopped, the Dressings should continue upon the Part untouched till the third Day, and then a vulnerary Balsam and Plaster may be applied to heal the Wound.

How a large
Wound of
the Internal
Jugular is to
be treated.

XI. When the internal Jugular Vein has received a large Wound, or is entirely divided, the Patient will presently die with the Loss of Blood. But if a Surgeon should be present when such a Wound is received, or should come in instantly afterwards, I would advise him to make a Pressure upon the divided Vein with his Finger, and to enlarge the Wound upwards and lengthways, till he can come at enough of the Vessel to make a strong Ligature upon it by the Assistance of a crooked Needle, such as I have described, *Plate VIII, Fig. 4*; and then he may fill up the Wound, and treat it as at N. X. By this Means the

the Life of the Patient may be saved, though the Course of the Blood through this Vessel be entirely cut off. I have often tried this Experiment upon a Dog, and he has recovered, and never suffered any apparent Inconvenience from it. Therefore I think it better to put this doubtful Remedy in Execution, than to leave the Case as desperate.

XII. A Wound in the carotid Artery is attended with greater Danger than a Wound in the internal Jugular: But if a Surgeon is present when the Wound is received, I think he should make the same Attempts to cure it. This is more likely to meet with Success in Wounds of the upper and middle Part of it, than in Wounds of the lower Part. But where the Wound is not in the Trunk of the Artery, but in one of its Branches near the Head, you should fill up the Wound with Lint, dipped in some styptic Liquor, if you have it ready; then cover it up with thick Compresses, securing all with a tight Bandage, and ordering an Assistant to make a Pressure upon the Part for some time with his Hand. See Part III. Ch. II. N. VIII. and Plate 37. Fig. 8. By these Methods I have very successfully stopped violent Hæmorrhages, that have proceeded from wounded Branches of the carotid Artery, which I have divided in taking out large schirrous, parotid, or submaxillary Glands. In these Cases you should never remove the Dressings till the third or fourth Day. Nor should the Lint, applied at the first Dressing, be forced out; but remain in the Wound, till it works its own Way. Otherwise a fresh Hæmorrhage, and that very violent, most commonly ensues (I speak from Experience) by which the Patient's Life may be greatly endangered.

How a
Wound in
the carotid
Artery is to
be treated.

XIII. In curing Wounds of the *Aspera Arteria*, the Surgeon ought, after cleansing the Wound, to endeavour to unite the divided Parts by the Assistance of sticking Plasters; or, where the Wound is large, by making two Stiches with a crooked Needle, dressing them up afterwards with some vulnerary Balsam, a sticking Plaster, and proper Compresses, advising the Patient to keep his Head in a prone Situation. ^a The Wound thus treated will easily heal, if it is made either by Puncture or by a cutting Instrument. But if any Part of the *Aspera Arteria* is carried away by a Bullet, the Suture is to no Purpose: Wounds of this Kind are more readily healed and filled up by the Use of a digestive Ointment, or vulnerary Balsam. But this must be particularly remembered, that the Head be kept in a prone Situation. If the *Aspera Arteria* is entirely divided, and the lower Part of it contracts itself into the Cavity of the Thorax, so that it cannot be laid hold on, and united to the upper Part, the Patient must undoubtedly die. If the Artery is not entirely divided, the Surgeon must raise the lower Part, and unite it to the upper by Suture ^b.

How to treat
Wounds of
the *Aspera*
Arteria.

XIV. Where the *Œsophagus* is wounded, whatever the Patient attempts to eat or drink passes through the Wound, and he is usually attended with Hiccoughs and Vomiting. Where the *Œsophagus* is entirely divided, there is no Possibility of curing it; but where it is only perforated or wounded in part, you may attempt the Cure by dressing the Wound with a vulnerary Balsam, by endeavouring to unite it with sticking Plasters, and by advising the Patient

How to treat
Wounds of
the *Œso-*
phagus.

^a Cures of this Kind are to met be with in BARTHOLIN, in *Hist. Anatomic. Cent. V. Hist. 89.* and in TULPIUS, *Obs. Lib. i. Cap. 50.* and in other Writers; many of whom GARENGEOT has quoted, Tom. ii. C. de Bronchotom.

^b A remarkable Instance of this is related by GARENGEOT, *Op. Chir. Tom. ii. C. de Bronchotom.*

to a strict Abstinence for some Days, or at least to take Nourishment by the Mouth very sparingly, at the same Time prescribing nourishing Clysters of Broths or Milk. But when the Necessities of Nature require Nourishment to be taken by the Mouth, the Wound should constantly be diligently cleaned afterwards, lest any Part of what was taken should stick by the Way and putrify, which would bring on very bad Symptoms^c. After the Wound is cleaned in this Manner, it is to be dressed daily with some vulnerary Balsam till it heals. But if the *Œsophagus* be wounded within the Thorax, the Situation is such that Art cannot reach it: The Cure must be left entirely to Nature.

How
Wounds of
the Medulla
Spinalis are
to be treated.

XV. Wounds of the *Medulla Spinalis* are best dressed with the *Balsamum Peruvianum*, *Essentia Myrrhæ aut Succini*, *Spiritus Massichis*, or with Medicines of the like Nature, mixed with a small Quantity of *Mel Rosarum* spread upon Pledgits, and applied moderately warm; and then covered with a vulnerary Plaster. The Event must be left to God's Providence, and the Strength of the Patient's Constitution. Slight Wounds of these Parts sometimes heal by this Method; but large Wounds here bring certain Death.

How to treat
wounded
Nerves in
the Neck.

XVI. Wounds inflicted upon the large Nerves which are situated in the Neck, are generally mortal; but where the Wound is very small, the same Methods may be attempted which we advised in the Wounds of the *Medulla Spinalis*.

C H A P. XII.

Of WOUNDS of the HEAD in general.

Wounds of
the Head
very dan-
gerous.

I. **N**O Wounds are attended with more Danger than those which are inflicted upon the Head; for the slightest Injury of the Brain will frequently bring on the worst of Symptoms, and even Death itself. Nay, Wounds of the Head which do not penetrate into the Cranium, and proceed only from a slight Fall or Stroke, even with a blunt Instrument, sometimes occasion a Rupture of some of the internal Blood-vessels, and an Extravasation of Blood in the Brain, which is attended with the most mischievous Consequences. Therefore even the slightest Wounds of the Head require all the Care and Caution that we are Masters of.

Wounds of
the Head are
of two kinds.

II. We ought carefully to distinguish, 1. What Parts of the Head are wounded; and, 2. In what Manner the Wound was made; for some Wounds of the Head are made with acute Instruments, either by stabbing or cutting; some are made with blunt Instruments, which is the Case in some Blows or Falls, and in Gun-shot Wounds. These of the last Class are attended with much greater Danger than those of the former; for they generally give such a violent Shock, as to burst the finer Vessels and Nerves of the Brain.

What Parts
are wounded.

III. As to the Parts which are wounded, they are either the common Integuments alone, or with these the Flesh of the Face, or the Pericranium, or the temporal Muscles, or the Cranium; or sometimes the internal Parts also; next,

^c The abovementioned Author, in Cases where the Patient could not swallow, recommends the Use of nourishing Clysters.

the Dura Mater, Pia Mater, and the Brain, either in its cortical or medullary Part, or in its Ventricles. When the Cranium is wounded, as first the inner Lamina of the Cranium, from whence Fragments are often splintered, and driven into the Dura Mater or the Brain itself; it is either cut, broken, or confused. It may not be amiss to divide Wounds of the Head into two Classes; 1. Those that affect the Face. 2. Those that hurt or wound the Cranium, the Cattle of the Brain, or some of its Integuments.

C H A P. XIII.

Of WOUNDS of the FACE.

I. **S**INCE the Face was intended for Beauty as well as for particular Uses, Of Wounds of the Face in general. two Things are to be remarked; to wit, That we do not leave worse Injuries upon the Face, and particularly the Eyes, than we were employed to cure; and that we make an even fair Cicatrix. As the Face consists of various Parts, each of which requires a distinct Method of Treatment, it will be necessary to treat of each of them separately.

II. In almost all Wounds of the Forehead that do not penetrate the Scull, this Of Wounds of the Forehead. is principally to be observed; that after the Wound is cleaned from grumous Blood, and any foreign Bodies that may have got into it, it should be anointed with some vulnerary Balsam, such as the *Balsamum Peruvianum*, *Copaiva*, or any other of that Kind; the Lips of the Wound are then to be kept together with narrow Slips of sticking Plaster, and over this a vulnerary Plaster is to be laid. Where the Wound is large, these Plasters will not be sufficient to form an even Cicatrix. Therefore to forward this End it will be proper to sprinkle the Wound with *Pulvis Sarcocollæ*, vel. *Pulvis ex Radice Symphyti*, *Gummi Tragacanthæ*, ac *Gummi Arabico præparatus*: You may then apply your Plaster, Compresses, and proper Bandages. The bloody Suture is never to be used either in these or any other Wounds of the Face, where it can be avoided; for the Stiches encrease the Number of Scars. If a Wound of the Forehead is made in a strait Line, the *uniting* or *incarning* Bandage, described in *Plate II, Lett. f.* will be of great Service in forming a fine Cicatrix: It is to be applied to the Forehead, after the same Manner which we advised it to be applied to the Abdomen in longitudinal Wounds of that Part. See *Chap. V, N. X.* But if the Forehead is wounded transversely, and the Fibres of the frontal Muscle are divided, it occasions a great Deformity; for the Power of lifting up the Eye-brows, and of contracting the Skin of the Forehead, ceases. In this Case, after cleaning the Wound, it is best to unite it with a Stich or two, dressing it with a vulnerary Balsam or Powder, and laying on sticking Plasters, securing all with a proper Bandage, and advising the Patient to keep himself still. It sometimes happens in young healthy Persons, that the divided Fibres of the Muscles join and unite without any Suppuration, where this Method of Dressing is diligently followed. If any great Degree of Hæmorrhage should ensue upon Wounds of this Part, the first Intention is to stop it with dry Lint, Compresses, and a tight Bandage; and at the next Dressing, after it has been well cleaned and washed with warm Wine, its

Lips should be brought together as before with Slips of sticking Plaster; or in transverse Wounds with a Stich or two, if it be necessary.

Of Wounds
of the Eye-
brows.

III. Wounds of the Eye-brows require much the same Treatment with Wounds of the Forehead: Only in Wounds of the Eye-brows more particular Care must be taken to guard against Inflammation, lest the Eyes should partake of the Injury. All sharp Things should be avoided both in Eating and Drinking: And if the Patient is of a plethorick Habit of Body, he should lose Blood in the Arm. The usual Dressings should be covered with Compresses, dipped in camphorated Spirit of Wine. If the Wound is large, and the Eye-brows entirely divided, it will be necessary to use the Suture, and to dress them up with a vulnerary Balsam and Plaster, covering up both Eyes, and keeping them as much as possible from Motion. By neglecting this Method, the Situation of the Eyes in this Case will have a very frightful Effect: And sometimes the Patient is deprived of his Sight.

Of Wounds
of the Eye-
lids.

IV. Wounds of the upper or lower Eye-lid will not readily heal; not so much from the Thinness of the Parts of which they are composed, as from the Quantity of Fluids with which the Eyes are continually moistened. At first therefore it will be best to foment the Eye *cum Decocto quodam ex Chamomilla, Hyssopo, vel Euphrasia confecto*, till the Flux of Blood is stopped, and the Wound well cleaned. When the Wound is transverse, you may stitch it up in the Middle with a fine Needle, sprinkling it afterwards with the Powder described at N. II. or anointing it *cum Balsamo Copaiva, de Meccha*, or with any other of the same kind, or with *Oleum Ovorum*, laying over it the *Emplastrum Diapalmae*, and tying it up so that the Eyes may have very little Power to move. Where the Wound is lengthways you must make several Stiches, and dress it up as before.

Of Wounds
of the Eyes.

V. Wounds of the Eye are attended with more Danger than any other incident to the Face; not only as the Patient is thereby often deprived of that most precious Blessing, the Blessing of Sight, (especially if the *Tunica Cornea* or *Uvea* are wounded, either by themselves, or conjointly together with the neighbouring parts) but as Death itself is sometimes the Consequence, if the wounding Instrument should pierce the Bones of the Orbit, so as to injure the Brain or its Nerves. If the Eye is wounded, but not so as to let out the vitreous or crystalline Humour, the following Method will be of great Service: The Wound should be anointed two or three Times in a Day with a Feather or fine Rag, well dipped in *Unguentum Alabastrinum, aut Albumen Ovi, aut Mucilag. Sem. Cydon. & Psyllii Aq. Rosar. parat.* and afterwards a small Compress is to be laid on, being well saturated with the following Collyrium. *R. Albumin. Ovor. N. 2. Aq. Rosar. ℥iiss. Ol. Rosar. 3℥. Camphor. Gr. iii. probè conquassando.* Nuck gives us a Case, where a Man was so wounded in the Eye, that part of the vitreous Humour fell out, nevertheless he cured him without leaving any Disorder in his Sight: His Method of Cure was as follows: He divided the Part of the vitreous Humour that hung out of the Eye from the rest, and then diligently fomented the Eye with a Collyrium, prepared *ex Albumine, Aquâ Rosarum, Bolo Armenâ & Camphorâ probè conquassatis. Gumm. Arabic. ℥i. in Aquâ Rosar. ℥i. solat.* is very serviceable in this Case; but if it is attended with any great Degree of Inflammation, which is frequently the Case, it will be proper to cover the small Compress with a larger, dipped in *Spiritu Vini camphorata calido*. The Bowels also should be kept loose for some Days with opening and cooling

cooling Medicines; if there is a plethoric Habit, Blood should be drawn from the Neck or Feet; all warm or sharp Things should be thrown out of the Patient's Diet, and great Care taken to keep him quiet: By observing these Regulations, not only the Eye, but the Sight of it also may be preserved. When the crystalline Humour, or any Part of it sticks in the Orifice of the Wound, it should be pulled out, that it may not bring on Deformity, or worse Mischief upon the Eye.

VI. When the vitreous and crystalline Humours are fallen out of the Eye, where the Humours are fallen out. not only the Sight, but Figure of the Eye must be entirely destroyed. Therefore at first it should be dressed with Compresses dipped in warm Wine, or Spirit of Wine, and afterwards with some vulnerary Balsam. The Deformity, which the Loss of Substance in the Eye will occasion, may be avoided by the Help of an artificial Glass or Silver Eye. See Plate VII, Fig. 1. But we shall treat more largely of this ^a in another Place.

VII. It sometimes happens when only the *Tunica Albuginea* and *Sclerotica* are Sight sometimes restored. slightly wounded, the *Cornea* and *Uvea* remaining unhurt, that the Eye recovers itself: And though both the vitreous and crystalline Humours fall out by the Wound ^b, yet they are renewed again by the Benefit of Nature, and the Office of Sight performed as well as before the Injury happened. Dr. SEEGER some time since was so kind as to communicate the History of a Case of this Sort to me, whence it appeared that he had restored Sight to a Woman after she had lost the Humours of her Eye. When we have duly considered this, we shall not altogether reject the Testimonies of BURRHUS and KERKRINGIUS, when they affirm to us, that they have acquired the Art of restoring the Sight after the Humours are entirely fallen out of the Eye. We may now also credit those who ^c affirm, that the Sight may be enjoyed without the Assistance of the crystalline Humour, notwithstanding ^d some have strenuously maintained the contrary.

VIII. Wounds of the Nose are generally cured by the dry Suture; but where Wounds of the Nose. the Wound divides the Cartilage, and penetrates so deep that the Lips of it cannot be kept in contact by the Application of sticking Plasters, the true Suture must be made through the Skin on each Side of the Wound. Though it sounds very unlike Truth that any Part of the Nose should be entirely separated from the rest, and afterwards united to it again by the Assistance of Sutures; yet BLEGNY affirms, that this has happened. See *Zodiac. Med. Gall. Edit. 1680, pag. 75.* When the nasal Bones are fractured, it is usual to place small Tubes made of Lead or Silver under them for some Time, lest the Passage of the Nose should be stopped by the shooting-out of the new Flesh: You will see these Tubes described at Plate II, P, Q, R. Externally you may use some Balsam, or *Essentiâ Mastichis, Succini, vel Myrrhæ*, or some glutinous Powder, such as you have seen directed at N. II. The Lips of the Wound should be kept

^a Tract. De Duâ. Oculor. Aquos. pag. 126, 127—132.

^b CREDAT JUDÆUS.

^c You may find many Instances related of Persons who have enjoyed their Sight after the Loss of the crystalline Humour, in SKENKII *Obs. Med.* HILDANI *Obs.* 26. Cent. I. *Act. Med. Hafn. Vol. I. Obs.* 69.

^d See my Treatises on the *Cataract, Glaucoma, &c.*

in contact with each other by the Help of sticking Plasters, and of a fourheaded Bandage; the Application of which will be explained when we come to treat professedly of Bandages.

Wounds of
the Lips.

IX. Wounds of the Lips are made either with sharp or blunt Instruments, or with Bullets: Wounds of the first Sort, whether they are made lengthways or transverse, are generally to be cured by the dry Suture: The Patient in this Case must diligently avoid both Chewing and Talking, his Diet therefore must be entirely Spoon-meat; if the Wound is very large, it will require the bloody or true Suture. In Wounds of these Parts which are made by blunt Instruments, by Falls, or by Bullets, the shattered Parts should be brought to Digestion, and the Lips of the Wound, after being cleaned, are brought together, either with sticking Plasters, or by the Suture, which is used for the Hair Lip, which we shall describe below.

Wounds of
the Cheeks.

X. Wounds of the Cheeks should be treated after the same Manner, and with the same Circumspection, which we advised for Wounds of the Lips: But if one of STENO's *Salivary Ducts* is wounded in its Passage cross the Cheek from the *parotid* Gland, the constant Discharge of Saliva into the Wound will prevent the Cure, till the Duct is perforated in the internal Part of the Cheek, to make a Passage for the Saliva into the Mouth. This Method of Cure is proposed by CHESelden, in his *Anatomy*.

Wounds of
the Ear.

XI. Wounds of the external Ear are easily united by sticking Plasters, unless the Cartilage is entirely divided, and then it will require the Help of the Needle, and the Application of vulnerary Balsams, with proper Compresses and Bandages: When the Ear is wounded in the Neighbourhood of the *Meatus Auditorius*, Care must be taken to prevent the Discharge of Blood and Matter into that Passage, which would do great Mischief to the *Tympanum*; this may be done by filling the internal Ear with Lint or Cotton.

Wounds of
the Tongue.

XII. The Tongue is so well guarded by the Jaw-bones and the Teeth, that it is very rarely the Subject of a Cut or Stab, but it is frequently bit in Fits of the Epilepsy, in violent Falls, and it is sometimes wounded by a Bullet. If the Wound of the Tongue is not very large, it will easily heal by the Application of *Ol. Amygdal. dulc. cum Sacch. Cand. q. s. admist. aut Mel Rosar. cum Ol. Myrrhæ per Deliquium*.

How to cure
large Wounds
of the
Tongue.

XIII. Large Wounds of the Tongue will not unite without the Assistance of the Suture. It is no wonder therefore that Wounds near the Root of the Tongue always leave a Fissure in the Part, since their Situation prohibits the Use of the Needle. To prevent Loss of Speech ensuing upon large Wounds of the Fore-part of the Tongue, the divided Parts should be brought together with the Needle, as soon and as neatly as possible, and afterwards anointed with the Medicines which we prescribed in the last Article, since sticking Plasters will not take Place here. PURMAN affirms, that he made use of Silver Threads in Sutures upon this Part to great Advantage. See his *Surgery*, P. I. Chap. VI. Gun-shot Wounds upon the Tongue are to be dressed with the Medicines which we recommended above at N. XII; for Sutures are of no Service in this Case. The Patient should keep from speaking, and live upon Spoon-meats during the Cure, but more particularly when the Wound is just beginning to unite.

Wounds of
the-Palate.

XIV. Wounds of the Palate will heal best if you anoint them with *Mel Rosarum* alone, or with the Addition of a small Quantity of *Balsamum Peruvianum*,

or

or sometimes *Oleum Myrrhæ per Deliquium*. These Remedies also have great Efficacy in curing all other Wounds of the Mouth.

C H A P. XIV.

Of the principal WOUNDS of the HEAD.

I. **W**E observed above, that Wounds of the *Cranium*, the Seat or Castle of the Brain, were to be reckoned under the second Class of Wounds in the Head. These, by way eminence, are alone called *Wounds of the Head*. They are divided into several Distinctions, according to the different Parts that are wounded, and the different Species of Wounds. These we shall treat of in the Order we enumerated them in *Chap. XII*, at *N. III*. We shall begin with the slightest, which are those Wounds that are inflicted upon the external Coverings of the *Cranium*. Intent of this Chapter.

II. There are several Ways of discovering that the Wound is terminated in the external Parts of the *Cranium*: 1. By the Eye. 2. By the Probe, which should be used very gently here, for fear of bringing on further Mischief. 3. By examining the Instrument with which the Blow was given, and by considering the Degree of Force with which it was impelled. And, 4. Lastly, by the Absence of violent Symptoms: For a violent Blow upon the Head will always be attended with Vomitings, Vertigo, Blood will be discharged by the Nose, Ears, and Mouth; and the wounded Person will lose his Speech and Senses. These Disorders will appear sometimes sooner, sometimes later; but always more violent, when the Wound is made by a Fall, or by some blunt Instrument, in which Case the *Cranium* is usually much shattered. The Blood which discharges itself by the Wound, when it is made with a sharp Instrument, will insinuate itself between the common Integuments and the *Cranium*. In Contusions that are made with blunt Instruments sometimes it will lie concealed under the *Cranium*, and by corrupting the *Periosteum* and *Cranium* will bring on Ulcers and Caries of the Bone; frequently it will occasion Fever, Convulsions, and Death. But here it must be observed, that the Symptoms are far from being certain Indications. For some, on receiving a Blow, drop down instantly, lose their Speech and their Senses; yet recover surprisingly: Others, at first, are slightly affected, and afterwards die. Wounds of the external Parts.

III. When the temporal Muscles are wounded at the same Time, the Patient will be attended with grievous Disorders; but more especially when this happens by a Blow or a Fall, or by a Bullet: Not only because these Muscles are necessary for the Offices of dividing the Food, and for forming the Speech; but because they are furnished with considerable Nerves, Tendons, and Arteries, which will partake of the Injury; and lastly, because the *Cranium* is thinnest in this Part. Wounds of the temporal Muscles.

IV. Wounds that are made on the external Parts of the Head by acute Instruments, and not attended with any violent Symptoms, are easily cured by the same Methods which we have before prescribed for other Wounds, *Chap. XIII*, *N. II*. Only in order to make the proper Applications, it will be necessary in the Cure of Wounds on the external Parts of the Head.

the first Place to shave the Part with a Razor. There will be no Occasion ever to make Sutures upon these Parts, since sticking Plasters will always answer your End. If the Wound be made lengthways on the Integuments of the *Cranium*, after cleaning it well, let the Lips be brought together, and bound with the uniting Bandage. See Chap. XIII, N. II. If the Wound be transverse, some Surgeons advise the bloody Suture without Exception. But I should rather chuse, if possible, to close it with Plasters and Bandages, and heal it like other Wounds: Unless there should be any loose Pieces of Flesh or Skin, or the Aperture be so wide, as not to be united by Plasters; for in these Cases the true Suture must be used. You should always endeavour to be as expeditious as possible in finishing each Dressing: The Medicines are to be applied warm, and the Air kept in a moderate Heat with hot Coals. If there should be any great Degree of Hæmorrhage, which will frequently happen from the Number of Vessels that are liable to be wounded in this Part, it must be stopped with dry Lint, or, where that is unequal to the Task, with the *Alcohol Vini, vel Lupi Crepitu, vel Pulvere quodam astringente*. These Applications should be secured with a tight Bandage. After the Hæmorrhage is stopped, you may dress with *Mel Rosarum*, or some digestive Medicines, till the Wound is well deterged; and then with a vulnerary Balsam, or dry Lint, till it is healed. If the Hæmorrhage be exceeding violent, the Artery must be tied up with a Thread. On the other hand, especially in plethoric Constitutions, we should not be too hasty in stopping the Blood: For the Discharge in this Case proves oft-times beneficial, and prevents many bad Symptoms that might otherwise ensue.

The Use of
medicated
Bags.

V. It has been frequently the Practice among Physicians to order^a medicated Bags to be applied to the Head, when it has been considerably wounded, to prevent or assuage the Violence of the Symptoms, such as Tumors, Inflammations, and Pain: These Bags are stuffed with *Betonica, Salvia, Majorana, Serpillo, Origano, Rorismarino, Floribus Lavendule, Salvia, Rosarum, & similibus*; these they boil in Wine, and after having gently pressed them, they apply them, as warm as the Patient can bear them, to the wounded Part. Where the Symptoms are already urgent, they make two Bags, and apply them alternately. By these Means the inspissated stagnating Blood is rendered fluid, and the Mischief is frequently removed without having recourse to the Trepan. When the Symptoms are too violent to be removed by these Applications, we are forced to use other Methods, according to the Nature of the Disorder. Of these we shall treat in the subsequent Articles.

How Contu-
sions are to
be treated.

VI. In violent Contusions of the Head, which will be discovered by the Tumor and Softness of the Part, by the Separation of the Integuments from the *Cranium*, and by the Collection of stagnating Blood which appears to be confined under the Skin; you should endeavour to divide the confined Fluids by attenuating Medicines externally applied, or to discharge them by making an Opening with a Knife; or lastly, to bring them to Suppuration. Where the Extravasation of Fluids is very considerable, it is best to discharge the greatest Part of them instantly by Incisions, and what remains will be easily dispersed. The Application of the medicated Bags, described above, will answer the Intention of

^a This Form is entirely laid aside with us in *England*, and Fomentations made of the same Herbs substituted.

thinning and dividing the stagnated Blood: But you may add to the Ingredients, which we mentioned, *Herba Chamædrys, Scordium, Sabina, Abrotanum, Absinthium, Mentha, Ruta, Flor. Chamomil. Sambuc. Rad. Bryoniae*, and Things of the like Intention. The Bags that are stuffed with these Ingredients may be quilted, that they may be divided into equal Parcels, and not run together in Lumps. Where Wine cannot be had to boil them in, you may make use of Water, adding a Proportion of Spirits of Wine, or Malt, or Melasses, after it has done boiling, and a few Ounces of Soap. But particularly, a Vein should be opened toward the Beginning of the Disorder, and the Mass of Blood thinned with proper Infusions of diluting Herbs, after the Manner of Tea, with all other attenuating Medicines. We shall treat more largely upon what is farther to be done in this Case, in a following Chapter upon *Contusions*.

VII. Where you find it impracticable to attempt the Attenuation and Division of the stagnating Fluids, it will be proper to attempt the Suppuration of them. In violent Contusions it will be advisable to prescribe the Application of such Cataplasms as are directed above at *Chap. II, N. XIII.* and below at *Chap. XV.* But in slighter Cases, where there is an Opening, the *Unguentum digestivum cum Aloë et Spiritu Vini paxillo admistum* will do the Business, covering the Part afterwards with a warm Plaster, such as the *Emplastrum de Meliloto, Malæticum, Diachylon simplex vel compositum, vel Empl. de Galbano.* After the Suppuration is formed, and the Matter discharged, the Wound will easily heal by the Application of a vulnerary Balsam. But in violent Contusions, where there is no Opening, or a very small one, by which the Matter cannot be discharged, you must enlarge the Wound with your Knife, to prevent the neighbouring Parts from being corroded. By this Means the Wound will easily be cleaned, and by observing the Directions we have frequently laid down above, the Cure will be speedily performed; and you will easier discover whether the Skull be sound or fractured.

VIII. When the *Pericranium* is wounded, but not in so great a Degree as to lay the *Cranium* bare, treat the Wound in the Manner we described above at *N. IV. of this Chapter*; omitting the Use of the vulnerary Oils there prescribed, because they would injure the *Cranium*, and substituting in their Room some warm balsamic Medicines, such as the *Balsamum Peruvianum, Copaivæ, Spir. Terebinth. Essentia Myrrhæ, Succini, Spir. Mastichis*, and others of that Kind. But where the *Cranium* is left bare and exposed to the Air, its internal Lamella, being robbed of its Nourishment, by the Destruction of the Vessels by which it was constantly supplied, will lose its natural Colour, and become yellow, livid, black, and by degrees separate from the neighbouring Parts, and exfoliate, as we term it, which will greatly protract the Cure of the Wound.

IX. To prevent the Corruption of the *Cranium*, and the Separation of its Lamina, and to expedite the Cure, the Surgeon should immediately cover the denudated Part, by drawing over the Skin, if it has not been too long exposed to the Air. He should then dress it with proper Plasters and Sutures: By which Means the Cure is commonly effected without Exfoliation. Even where the Part has changed Colour, it is not always necessary to wait for a Separation of the Lamina; as many are of Opinion it is often sufficient to apply dry Lint to the naked Bone, and dress the Wound with a Digestive: By which Method alone it generally heals. In order to hasten the Extoliation of the *Cranium*, and forward

forward the Cure, the Surgeon ought to bore several ^a Holes through the denuded Part, as deep as the *Diploë*, with an Awl, or with Instruments like those described at *Plate VII, N. II. and Fig. 7. Lett. A.* This Operation does not only forward the Exfoliation of the Part, but make way also for the sprouting up of fresh Vessels, and forming as it were a new *Pericranium*. The Dressing, which ought to be performed each Time with Expedition, and not repeated so often as in other Cases, is to be applied in the following Manner. When the Wound is properly cleaned, Pledgits, first dry, afterwards well-saturated with *Essentia Mastichis, Succini*, or any other mild balsamic Medicine, with the Addition of a small Quantity of *Mel Rosarum*, are to be laid upon the injured Part of the *Cranium*: Over these you may clap the *Emplastrum de Betonica*, and over that the Bolsters and Bandage for the Head (*Fr. Couvre chef*) described above at *Plate III, Fig. 1. A.* These Applications should be continued till the *Cranium* appears to be sound, and the Wound is in a Condition to heal. When the *Pericranium* is contused, but not separated from the *Cranium*, you must endeavour to disperse the stagnating Fluids, by the Application of medicated Bags, described at *N. V, VI.* If these have not the desired Effect, you may have recourse to Scarification, and warm Fomentations.

Of Wounds
in the tem-
poral Mus-
cles.

X. If the temporal Muscles are wounded by a cutting Instrument; when the Wound is cleansed, it must be treated in the common Method. Should the Artery suffer, the Hæmorrhage must be stopped either by Pledgits, Compresses and Bandages, or by a Ligament of Thread. If the Wound be made by Puncture or Contusion, you must have recourse to the medicated Bags; and what extravasated Blood lies beneath, should be drawn off, by Incision. When we find that the *Cranium* is fractured under these Muscles, and that there is con- creted Blood under the Fracture, then an Incision may be made in the Muscle lengthways, or obliquely, if it be judged necessary; that the Wound may be cleared of the stagnated Blood and the Fragments of the *Cranium*, if there be any, in order to facilitate its healing.

Of Injuries
of the Cra-
nium.

The several Ways by which the *Cranium* may be hurt; by Falls, Blows, Cuts, &c. which has occasioned Authors to divide Injuries of this Part into several Distinctions; to-wit, into Contusions, Depressions, Fractures, Fissures, and ^b Contra-Fissures, that is, where the Fissure happens on the Side opposite to that which received the Blow.

Diagnostic
Signs.

XI. There are several Circumstances concerned in discovering an Injury of the *Cranium*. In the first Place, you must diligently inspect the wounded Part, and make Enquiry with what Force the Blow was given that occasioned it: After this you may search the Wound with a Probe, but very circumspectly, lest by pushing it rashly forward you should injure the Brain. Some use a Pen in the room of a Probe, when they are searching for Fissures of the *Cranium*, and if the Pen is pointed at the End like a Tooth-pick, it will easily detect any Inequality or Roughness of the Bone: But you must be very careful not to suffer yourself to be deceived, as HIPPOCRATES was, by the Sutures. When Fissures of

^a See HILDAN. *Cent. iv. Obs. 95.* and RUYSCH. *Obs. 5.*

^b Many Writers have denied this Case to be possible; but not only HIPPOCRATES, in his Book *De Vain. Capit.* but CELSUS, *Lib. viii. C. 4.* and ÆGINETUS, *Lib. vi. C. 90.* have plainly described this Case; but amongst the Moderns D. WAGNER, in a Treatise *De Contra-fissurâ*, and LE MAIRE, *De Resonitu*, have put this Matter out of all doubt.

the *Cranium* are so very fine, that they escape the Eye, and the Touch of the Probe, though the Violence of the Symptoms sufficiently declare that the Patient has received an Injury of this Kind, it will be necessary to lay the Bone bare, and to drop Ink upon the Part of it which you suspect, and wipe it off again immediately with Lint: And if any Part of it is fissured, you will find a black Stroke remain, notwithstanding your Endeavour to wipe the Bone clean. If you are still at a Loss, put a Key into your Patient's Mouth, and bid him bite hard upon it. If this occasions a Stridor of the Teeth, and Pain, Surgeons are apt to determine that there is a Fracture or Fissure in the *Cranium*. Where the Bone has lost its natural Colour, they will not allow it to be whole. The most certain Signs of a fractured *Cranium* are the violent Symptoms that immediately succeed the Injury: Such as vehement Pains, Vomitings, Vertigo, and Noise in the Ears; yet these are not always to be depended on: If Blood at the same time is discharged from the Nose or Ears, the Senses and Reason entirely lost, and the Patient is continually sleeping, the Matter is out of all doubt. In a few Days after the Wound is received you will have a small Discharge of thin fetid Matter: About the seventh Day the Integuments separate from the Bone, and the *Cranium* itself is sometimes so very foul, that it lets the Matter through to the Membranes of the Brain, which presently partake of the Disorder, and occasion acute Pains, Spasms, Drowsiness, Loss of Motion, or Rigor of the Limbs, Loss of Speech, Apoplexy, and at length Death. All these Mischiefs may arise from a very small Fissure of the Skull, Examples of which you will find very frequent amongst the Writers in Surgery.

XII. This ought to teach us to be very cautious in delivering our Opinions Prognostic. concerning the Event of Wounds in the Head; for we can never promise a Cure, though the Wound should at first appear to be very slight. On the other hand, many who labour at first under violent Symptoms, by Bleeding and proper Remedies have been known to recover beyond Expectation. I shall here lay down some Observations which are well worthy of a Surgeon's Attention: It is very difficult to cure a Man who is poxed, or of a scorbutic Habit, at the Time he receives a Fissure in the *Cranium*. When the temporal Bone is the Subject of the Injury, the Cure is very doubtful. There remain very little Hopes of Recovery where the *Cranium* appears black. They also are in extreme Danger who have a black dry Tongue, full of Clefs, and beset with Pustules, or are attended with a Diarrhœa or Dysentery, or where the Water is either quite clear and white, or as turbid as the Urine of Cattle.

XIII. The first Question to be asked, when you come to examine a Wound How Injuries of the Cranium are to be treated. of the Head, is, whether it was made with a sharp or a blunt Instrument? If the Wound was made with a sharp Instrument, and penetrates into the *Cranium*, it must be filled at the first Dressing with dry Lint, in order to stop the Blood; but in the following Dressings, after the Matter is well wiped away, you may apply the *Essentia Succini, Mastichis, Myrrhæ, cum admixto Rosarum Melle*. These Dressings are to be repeated as long as the Condition of the Wound shall require it. See above, N. IV. Where the *Cranium* is very much shattered by the Blow, and the Brain wounded, this Case is attended with very great Danger, but requires the same Method of Treatment with the former, only greater Diligence must be observed in cleansing this Wound, and the more Expedition in applying the Dressings, to keep it from the Injuries of the Air. If the *Cranium*

is so perforated by a cutting Wound, that it cannot well be cleansed from the Blood or Splinters; or by a Puncture, that brings on any dangerous Symptoms, the Trepan must be applied. If a Piece, quite broke off from the *Cranium*, yet sticks to the Integuments; that Piece, after cleansing the Wound, should be restored to its Place, the Skin stiched together, and the Wound properly dressed. This Method generally succeeds.

Wounds of
the Head
with a blunt
Instrument.

XIV. When a blunt Instrument is the Occasion of an Injury upon the *Cranium*, if the injured Part does not sufficiently appear of itself, we ought to use great Industry to discover it.

How the
Wound is to
be examined.

XV. You will easily discover the injured Part, if you divide the common Integuments to the Bone, where they appear tumid and soft: In making your Incision you should take great Care not to lay too much Stress upon your Knife, lest you should force Splinters of the fractured *Cranium* into the Substance of the Brain.

How the In-
cision is to
be made.

XVI. If you find it necessary to make an Incision through the Integuments, it may be made in a right Line; but where that is not sufficient, let it be formed like the Letter X, about an Inch and an half in Length, lifting up the Skin at each Angle, and leaving the Bone bare. The Blood which is spilt may be taken up with a Sponge, and dry Lint stuffed between the Skin and the *Cranium*. Having found out the injured Part of the *Cranium*, you may now apply the *Trepan* if you shall think it necessary. Some Surgeons in scalping prefer the Figure of the Roman Letter V, or the Greek Λ ; others prefer a longitudinal Incision. In Wounds which are made near the Temples, great Care must be taken not to divide the muscular Fibres. There are Surgeons who contend much for an Incision in the Form of a T. But the Situation of the Wound will always determine you with regard to the Figure of the Incision which you shall make, either for the Discovery of a Fissure, or to prevent or remove bad Symptoms.

What is to
be done after
Scalping.

XVII. Having discovered the injured Part of the *Cranium*, and cleared away the gummy Blood and Matter with a Sponge, you are next to remove any Splinters of Bone that may come in your way, with your Fingers or the Forceps: Where they hang to the *Pericranium*, you must use the Scissors: Where they adhere pretty firmly to the neighbouring Parts of the *Cranium*, it is more adviseable to replace them, than to endeavour to remove them by Violence. But if there are no Splinters or Fragments of Bones, and the *Pericranium* is bruised, inflamed, or bloody, you should then scarify the Part, and proceed as above at N. VIII.

How a Con-
tusion is to
be treated.

XVIII. But if the *Pericranium* is quite corrupted and separated, cover the Bone with dry Lint; or bore several small Holes through the external Lamella of the Bone, till you find Blood proceed from the wounded *Diploë*: After this you may dress the Part up with balsamic Medicines, (N. IX.) If upon repeating the Dressings you discover fresh, yellow, or black Spots, the Parts so discoloured are to undergo the same Operation. This is the easiest and most expeditious Way of remedying this Disorder.

How Fissures
are to be
treated.

XIX. When you discover a Fissure in the *Cranium*, attended with no other bad Symptoms, but white, yellow, or brown Spots upon the Face of the Bone, you will find it sufficient to bore down to the *Diploë*, and dress it with warm balsamic Medicines: In the mean time Bleeding and Diluters must not be omitted.

ted. There is not always Occasion for *Trepanning* in Fissures, as many besides HIPPOCRATES have declared. But where any violent Symptoms come on, which demonstrate an Extravasation of Blood in the Cavity of the *Cranium*, which cannot be evacuated or dispersed by the Methods abovementioned, the *Trepan* is to be called for without Delay.

XX. The Surgeons amongst the Antients used another Method for the Cure of Fissures of the *Cranium*, that were not attended with very bad Symptoms. Their Method was to scrape away the upper Table of the Bone, 'till they came down to the *Diploë*: For this Purpose they used *Rugines*, or *rasping Chissels*, of different Shapes, semi-circular, plain, or acuminate, as you may see in *Plate VII, Fig. 3, 4, 5*. This Practice is still continued by some; but the Method of boring is far less troublesome, and therefore justly preferred to it.

The Method used by the Antients in this Case.

Of DEPRESSIONS of the CRANIUM.

XXI. The Skull in Infants and Children is sometimes depressed or dented in by a Blow, like Tin or Copper, without any manifest Fracture; or at least fractured in such a Manner, that from its Flexibility it does not start out, but still adheres firmly to the neighbouring Bones. But in Adults this Case cannot happen; for the Bones in them are become so rigid, that it is impossible to beat in any Part of the *Cranium* without breaking the Bone to Pieces. These Injuries of the *Cranium* are called by the Surgeons *Fractures* or *Depressions*: The Brain is frequently injured by these Accidents, and the Actions of it disturbed.

Of Depressions of the Cranium.

XXII. These Accidents are attended with full as bad Consequences as those we have already described. According to the Degree of Depression, so is it attended with more or less Danger. Sometimes it is quite incurable: For in this Case the Vessels of the Brain are very liable to be injured, which frequently produces such an Extravasation of Blood in those Parts, as must necessarily bring on grievous Disorders, and frequently Death itself.

Disorders occasioned by it.

XXIII. You may easily discover a *Fracture* or *Depression* of the *CRANIUM*; 1. By your Eye. 2. By the Touch. 3. By considering the Cause of the Injury. 4. By the Symptoms that succeed it; though these alone are very uncertain. Depressions and Fractures of the *Cranium* are by no Means so difficult to discover as Fissures. That Fractures of the Skull are attended with great Danger, and frequently with Death, nobody will deny, who considers well the Structure of the neighbouring Parts.

A Fracture in the Cranium is easily discovered.

XXIV. The first Thing to be done towards relieving this Disorder, is to lift up any Part of the Bone that is depressed, or beat in upon the Brain, and replace it, if it still adheres to the neighbouring Bones; or to remove any other Body by which that Part is compressed. Sometimes a Splinter, which is quite separated from the rest of the Bone, is driven into the Cavity of the *Cranium*, and lies constantly vellicating the Brain and its Membranes with its pointed Parts. This is to be removed without delay, yet very tenderly, and with the Caution we recommended, *N. XVIII.*

How it is to be treated.

XXV. When slight Depressions are made in the Skulls of Infants, without bringing on any bad Symptoms, you must not use the forcible Methods of raising the depressed Part, which we directed above; but call those Medicines

How slight Depressions in Infants are to be treated.

into Use which we advised for the Cure of Contusions, such as the medicated Bags boiled in Wine, or Spirit of Wine camphorated; or, lastly, apply a Plaster to the Part, such as the *Emplastrum de Meliloto, sive de Betonicâ*. Nor must you omit internal attenuating Medicines, N. V. These Applications frequently cure slight Impressions, and prevent the mischievous Consequences which might be expected from them.

How a large
Depression is
to be treated.

XXVI. But where a greater Degree of Depression happens to Infants, the Elevation or Restitution of the Parts is performed in the following Manner: After shaving the injured Part, they apply a Plaster made of very sticky and gummy Materials, spread upon a strong Piece of Leather, to the Middle of which a Cord is fastened. This Plaster is laid on pretty warm, and left in its Situation till it is grown cold: The Surgeon then taking hold of the Cord that is fastened to it, pulls the Plaster directly upwards, and with it the depressed Part of the *Cranium*. See Plate VII, Fig. 6. If this does not succeed at the first Trial, it is to be repeated. The Application of the Cupping-glass to the depressed Part will sometimes succeed, especially if you stop the Patient's Breath at the Nose and Mouth during the Operation. But if neither the Plaster nor Cupping prove of any Service, it will be necessary to call for the Assistance of an Instrument like an Awger; such an one as you see described at Plate VII, Fig. 7. Lett. B; which is to be applied after the common Integuments and *Periosteum* are removed. ROHAULT rejects both the Cupping-glass and Awger, and advises the *Trepan* in their stead, where the Symptoms are bad. See his Treatise above cited, p. 53.

How a fractured
Cranium is to be
treated.

XXVII. But when the *Cranium* is so depressed, whether in Adults or Infants, as to suffer a Fracture, or Division of its Parts, it must instantly be relieved. The Part depressed, which adheres, after cleansing the Wound, must be restored to its Place; what is separated must be removed, and the extravasated Blood be drawn off through the Aperture. Some are very high in their Commendations of a sternutatory Powder for this Purpose, asserting that the Distention of the Brain is so violent in the Act of Sneezing, that it will restore the depressed Parts of the Bone to their former Situation; but the ill Consequences that may attend this Practice are so grievous, that in my Opinion it ought to be rejected. You will find the Elevatories described at Plate VII, Fig. 7. Lett. C, and at Fig. 8. very serviceable, if there is a small Foramen to which the Instrument can be fastened. But if there is no Hole already in the Part, you must apply the screw End of the Instrument at Fig. 7. Lett. B, or one of that Kind, by which Application the depressed Part may be restored. In the mean time an Incision ought always to be made through the common Integuments, that they may be drawn back for the Instrument to take place, N. XV. and a Foramen should be made with a sharp-pointed Instrument, (Fig. 7 or 2. Lett. A) to admit of the End of the *Trepan*.

A particular
Kind of Ele-
vatory with
three Feet.

XXVIII. But as the Elevatories at Fig. 7 and 8. are so contrived, that where the neighbouring Bones are depressed or fractured, these Instruments cannot be applied without Danger of encreasing the Complaint, it appeared necessary to the Surgeons amongst the Antients to invent another Instrument for this Purpose, which might be applied with more Safety; this they called, from the Number of its Feet, *Tripes*, Tab. VII, Fig. 12. It is near twice as big as the Figure we have given you. The Feet AAA may be placed at farther

ther Distances, or brought nearer to each other, as you shall see occasion. The Manner of applying it is this. The Feet of this Instrument are applied to the sound Parts of the Head; and the Screw B, C, by frequently turning round its Handle D D, will presently lay hold of the depressed Part of the *Cranium*, especially if you have before-hand made a small Hole in the Middle of it with the Awl at *Fig. 2*. Upon turning the Screw, E E, the *Trepan* is raised by Degrees, and with it the depressed Part of the *Cranium*. You will conceive this more clearly by examining *Plate VII, Fig. 13*. But if any Opening shall appear between the fractured Parts of the *Cranium*, it will be better to take off the pointed End of the Instrument, and in its room fix the Elevatory G, by the Screw H, about the Part at Letter F of *Fig. 12*. and by the Assistance of this the depressed Part may be raised, as we taught above.

XXIX. HILDANUS describes an Instrument for this Intention, which is a much simpler Instrument than that which we have just shewn you, and a very convenient one for the Purpose, See FAB. HILDAN. *Cent. II. Obs. 4*. We have given you a Description of this Instrument in *Plate VII, at Fig. 14*. You should be provided with the Awger A, and the Hook at *Fig. 15*; through either of which, according as you shall see necessary, the Lever B C may be passed, after the Instrument is fixed upon the depressed Part of the *Cranium*. The Plate D is to be placed upon the sound Part of the Head, laying Bolsters under it to prevent Pain: Then by raising the End of the Lever at B, the depressed Part of the *Cranium* will be gently elevated and restored to its natural Situation. You will observe a Joint at the Extremity of the Lever C, to accommodate the Plate D to the Convexity of the Head in some Parts of it, which may be also raised or depressed by the Screw E. If you please, you may make the Lever longer than it is represented here, which will add to its Force. PETIT has described a new Kind of Lever^a; which I have given you the Figure of, *Plate XXXIX*. as it may sometimes be of Service.

XXX. But if any Part of the Bone is entirely separated from the rest, and driven so deep into the Cavity of the *Cranium*, that it cannot be elevated or extracted by the Methods which we have already opposed, you must perforate the neighbouring sound Part with a *Trepan*, and divide the intervening Part with a fine Saw, *Fig. 9*. as deep as you shall think you can with Safety. After this you may cut it entirely through with the Chissel and Leaden Mallet at *Fig. 10, and 11*. Having made an Opening in this Manner, you will have a full command of any Splinters or foreign Bodies that are driven into the *Cranium*, and will more easily evacuate the extravasated Blood. Cases that require this last Method of operating are very rare, but they are no less necessary, though the Operation requires great Pains and Dexterity in the Performance of it.

XXXI. Having raised up the depressed Parts of the *Cranium*, and restored them to their natural Situation, you must take great Care to secure them from a fresh Depression; the Patient should lie on the sound Side of his Head, the fractured or depressed Part should be guarded with a Brass or Steel Plate, and the wounded Part should be treated according to the Rules which we have already laid down.

^a *Memoires de Chirurgie*, Tom. i. p. 302.

EXPLANATION of the SEVENTH PLATE.

Fig. 1. An artificial Eye made of Glass or Silver, painted after the Life; this may be introduced into the Orbit, and supply the Place of the natural Eye, and prevent the Deformity that will ensue upon the entire loss of that Organ.

Fig. 2. An Awl, or sharp Instrument to perforate the external Table of the Cranium.

Fig. 3, 4, 5. Different Forms of Rugines, or rasping Chissels, to scrape the Cranium, or other Bones.

Fig. 6. Shews how the Depression of the Cranium in an infantile State may be relieved by sticking Plasters.

Fig. 7. A, a quadrangular, or pointed Steel Instrument, to perforate the external Table of the Cranium. B, an Awger. C, an Elevator to raise depressed Bones of the Cranium.

Fig. 8. Another Elevator for the same Uses with the former.

Fig. 9. A small fine Saw; and *Fig. 10.* a small Rugine, which may be used with or without the Handle described to that at *Fig. 3.*

Fig. 11. A wooden Mallet, the Head of which is filled with Lead.

Fig. 12. An Elevator with three Feet. See above, N. XXVIII.

Fig. 13. Describes the Method of applying this Instrument.

Fig. 14. HILDANUS's Elevator. See above, N. XXIX.

Fig. 15. A Hook belonging to HILDANUS's Elevator.

How extravasated Blood is to be discharged from the CRANIUM.

Disorders occasioned by Extravasation of Blood.

XXXII. In the Injuries of the Cranium that we have been describing, that is, in Contusions, Fissures, Depressions, and Fractures, one or more of the Blood-vessels that are distributed upon the *Dura Mater* is frequently divided. The Blood that is discharged by this Accident greatly oppresses the Brain, and disturbs its Offices; this frequently brings on violent Pains, Deprivation of Senses, and other Mischiefs, and at length Death itself, unless the Patient be timely relieved. If the Quantity of extravasated Blood be ever so small, it will certainly corrupt, and affect the *Meninges* and the Brain itself with the same Disorder; from hence will proceed violent Inflammation, Delirium, Ulcers, and what not? even Death itself, sooner or later. And this will frequently be the Case after a violent Blow upon the Cranium, when a Vein or Artery is wounded, though the Bone should escape without any Injury.

Where the Blood is spilt.

XXXIII. In these Injuries of the Head, the Blood is spilt either between the Cranium and *Dura Mater*, or between the *Dura* and *Pia Mater*, or between the *Pia Mater* and the Brain; or lastly, into the *Sinuses of the Brain*. Each of these Cases are attended with great Danger, but the deeper the Extravasation happens, and the more copious the Discharge, so much the greater will the Danger be.

How to discover an Extravasation of Blood in the Cranium.

XXXIV. You may suspect that Blood is extravasated in the Cavity of the Cranium from the Violence of the Symptoms which succeed: If the Patient lies

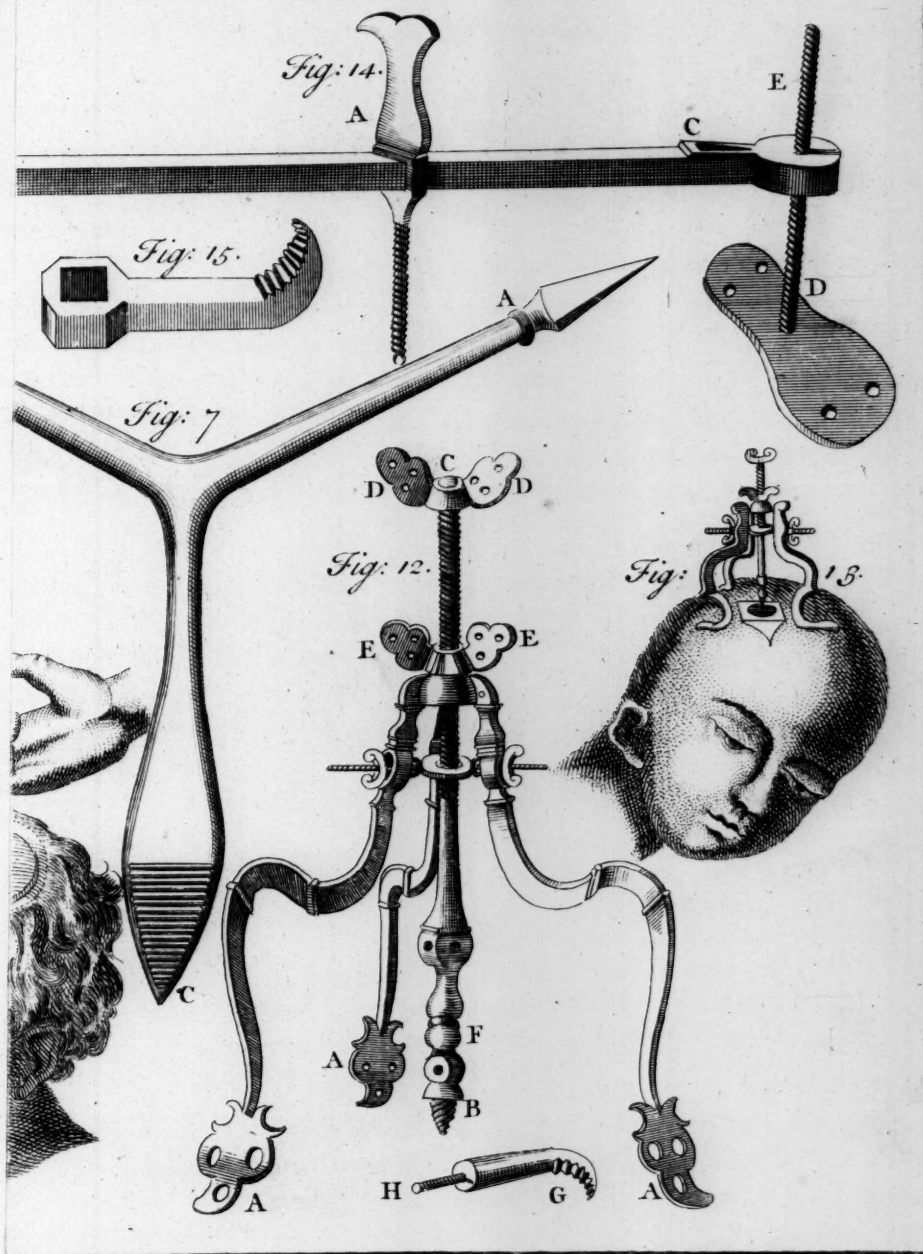


Plate 7.

Fig: 1.



Fig: 2.

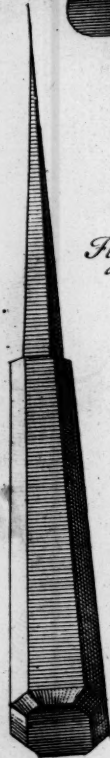


Fig: 3.



Fig: 4.



Fig: 10.



Fig: 11.



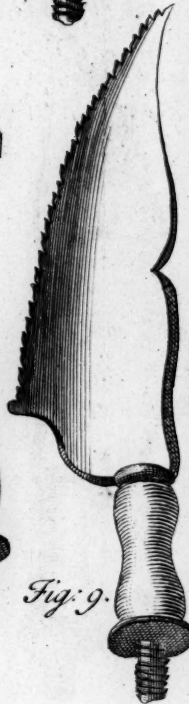
Fig: 8.

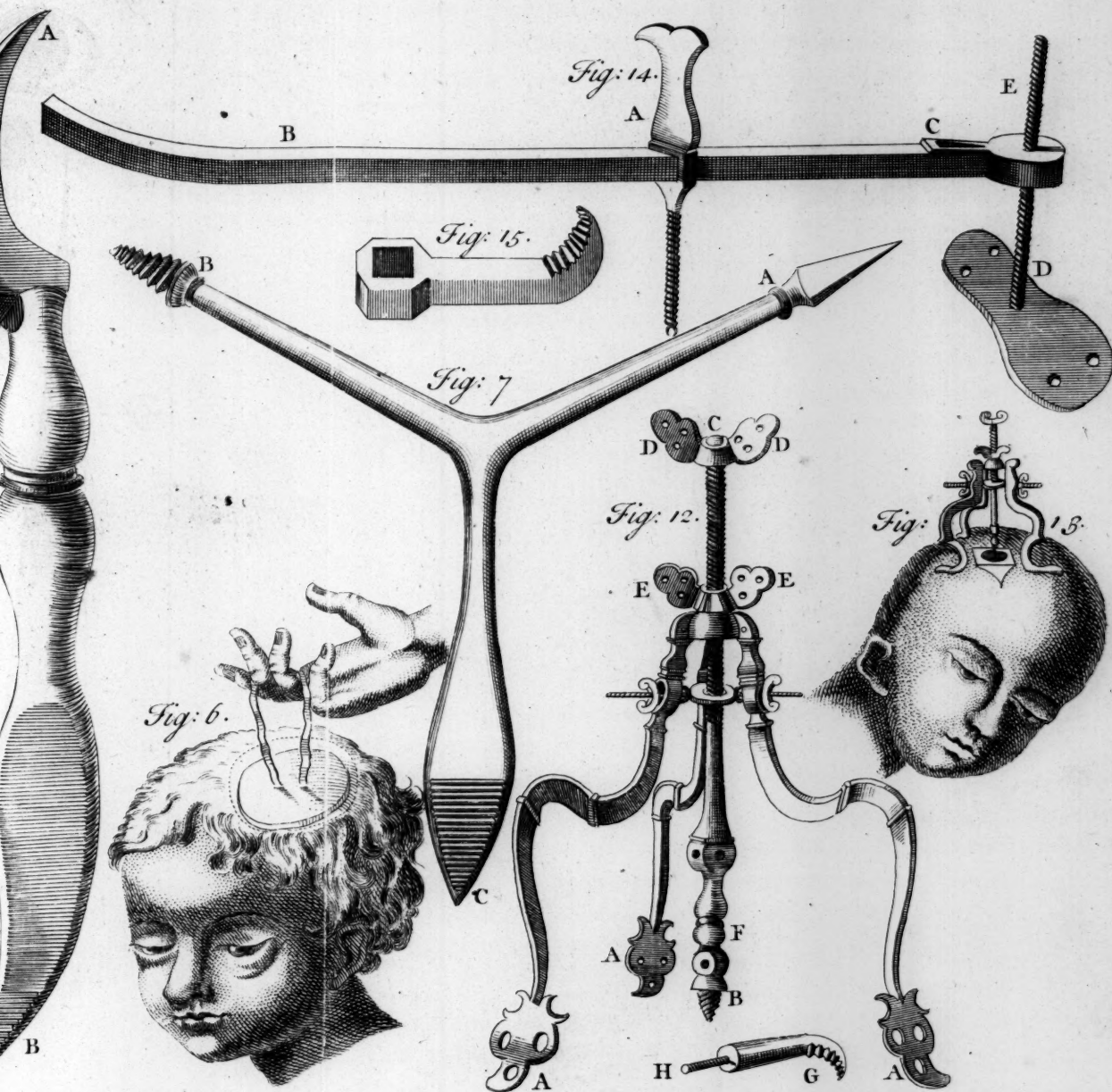


Fig: 5.



Fig: 9.







still without Sense or Motion; if Blood flows from the Mouth, Ears, or Nose; if the Eyes are much inflamed and swelled; if Vomiting succeeds; when upon the Remission of these Symptoms the Patient complains of a remarkable Heaviness of Head, a Sleepiness, Vertigo, Blindness, Spasms, and Disorders of this Kind. When the Quantity of extravasated Blood is very considerable, and oppresses the *Cerebellum*, the Patient dies upon the Spot: But when the Extravasation is not in a very large Quantity, or at least does not affect the *Cerebellum*, Life still remains, but the Symptoms related above come on. Sometimes these Symptoms come on very slowly; and great Numbers of Persons, who have appeared at first to have been but slightly wounded, have died in this Manner, after some Time, contrary to all Expectation. Therefore I cannot help again admonishing the Surgeon, that after violent Blows of the Head, though no violent Symptoms should immediately urge, yet he should be very cautious in delivering his Prognostic, and not be too hasty in his Opinion; nor, by treating the Case as slight and indifferent, endanger the Life of his Patient. But when violent Symptoms immediately ensue, you may always be sure that there is an Extravasation of Blood, though no great Injury appears upon the external Part of the Head.

XXXV. If you can find no Fracture, Fissure, or Contra-fissure, in the *Cranium*, nor even any external Injury upon the Integuments of the Head after a violent Blow, and the Patient is deprived of his Senses, you will find it difficult to determine in what Part of the Head an Extravasation is seated. It will be proper therefore, 1. To shave the Head all over, that you may be the better able to examine it. For if any Part is softer than ordinary, or enlarged, or red from a Stagnation of Blood, it is plain that this is the Part which received the Injury. You may also examine Persons who were present at the Accident, from whom you may frequently get Light into the Affair. But, if you are still left in the Dark, 2. Cover the whole Head, after it is close shaved, with an emollient Plaster, laying over it medicated Bags well heated: This Application will, in a few Hours, produce Tumor and Softness upon the injured Part. 3. Sometimes the Patient, though he lies speechless, and to all Appearance senseless, will be continually clapping his Hand to the aggrieved Part. 4. If either Side of the Patient has lost Sense and Motion, and is become paralytic, it is an apparent Sign, whatever some may think to the contrary, that the Injury was received on the contrary, or sound Side. See MORGAGNI *Adversaria Anatomica* VI. et *Dissert. de Resonitu*, Argentorat. 1722. Edit. Pag. 23. If you discover any Wound in the Skin, you should enlarge it with the Knife, till you come at the Injury in the *Cranium*, whether Depression, Fissure, Contra-fissure, or Fracture.

How to discover the Part in which the Blood is extravasated, though there appears no external Wound.

XXXVI. When you have discovered the Seat of the Injury, the first Intention is to discharge the extravasated Blood, which must otherwise endanger the Patient's Life; and then to clean the Wound, and remove all Splinters or extraneous Bodies. Many Writers in Surgery advise the instant Use of the Trepan, to make way for a Discharge of the extravasated Blood; but since this is a difficult and dangerous Operation, and many have recovered without having Recourse to it, I see no Reason for attempting it, unless we are driven to it by absolute Necessity. Therefore I think it is best to try first the Force of attenuating and dividing Medicines in this Case.

How the injured Part is to be treated.

XXXVII. With

How inspissated Blood should be attenuated.

XXXVII. With this Intention, 1. Open a Vein, and draw away as much Blood as the Strength of your Patient will admit: This will take off the Impetus of the Vessels, and prevent the Extravasation of more Blood. 2. Prescribe a pretty brisk Purge, to lessen the Quantity of Fluids, for which Purpose you may also give sharp Clysters. 3. Foment the Head with medicated Bags, and apply a Melilot Plaster to it. 4. Endeavour to rouse the Patient by volatile Applications to his Nostrils, such as *Sol volatile oleosum*, *Spiritus Salis Ammoniaci*, *vel Spiritus Cornu Cervi per se*. Lastly, 5. Give frequently attenuating Fluids warm, such as Infusions prepared *ex Theâ, Betonicâ, Salviâ, Rorismarino, Lavendulæ Floribus, Ligno Sassafras*, and the like. This Method will contribute greatly to the thinning and diluting the Blood.

XXXVIII. Yet this does not immediately procure the desired Effect, therefore it must be continued for some Time, and the Prescriptions frequently repeated: And more particularly when the Symptoms seem by degrees to abate. The Repetition of Bleeding in this Case may seem strange to some, but it must be to those who are ignorant of the good Effects it produces by lessening the Quantity of Fluids, and by restoring the Course of the stagnating Blood. If the Patient finds a little Relief from the first Bleeding, it will be proper to repeat the Operation a second and a third Time, especially if he is young and athletic, and to apply the Remedies which we have recommended above in the Intervals, till the Disorder is entirely removed.

Sometimes the Trepan is necessary.

XXXIX. But when you find, notwithstanding these Applications, that the Symptoms rather encrease than abate, you will be obliged to make a Perforation in the *Cranium* with the *Trepan*, near the Seat of the Wound, that there may be a Passage for the Discharge of the confined grumous Blood. But there should be great Caution always used in this Operation. If the extravasated Blood or Matter be collected under the *Dura* or even the *Pia Mater*, an Incision must be made in these Membranes, without reserve; that the Enemy may be removed: The Wound is then to be cleansed, and afterwards healed by proper Applications. When you cannot discover the Part of the Head which is principally affected, and the Symptoms are still as violent, or rather aggravated, you must perforate the Skull in several Places, till you hit upon the right. For, if this Method does not always produce the Effect desired; yet, with CELSUS, it is far better to try a doubtful Remedy, than none at all. I shall teach the Manner of performing this Operation, and the Methods of healing the Wound, in another Part of this Work, which treats professedly of *Chirurgical Operations*.

Principal Writers on Wounds of the Head.

XL. If you desire to see Histories of Cures of Wounds of the Head, consult HIPPOCRATES, *De capitis Vulneribus*, cum ARANTII & PAAWII *Commentariis*, and CELSUS on the same Subject. Add to these, BERENGARIUS *De Fracturâ Cranii*, ARCEUS *de Vulneribus*, SCULTETUS in *Observationibus*, 1 ad 23. HILDANI *Observationes variæ*, TULP. *Obs. L. i. C. 14*. SCHULTZIUS, *De Capite læso*, BELLOSTIUS in *Chirurgo Nosocom*. WOYTIUS and WALTHERUS *De capitis Vulneribus*, and several others: But particularly amongst the modern Writers, ROHAULT's Book on Wounds of the Head, called *Traité des Playes de Tête*, 4to, 1720, and LE DRAN, in his *Chirurgical Observations*.

CHAP. XV.

Of CONTUSIONS.

I. **A** CONTUSION is any Hurt of the Body that is inflicted by a blunt Instrument: And since in this Case an infinite Number of small Vessels and Fibres are injured and broken, a Contusion may properly be said to be a Congeries of an infinite Number of exceeding small Wounds. It is well enough called by the GREEK PHYSICIANS *Eccbymosis*, and by CELSUS *Vulnus Collisum*, *Lib. V. Cap. 26.* A Contusion what.

II. Contusions may be distinguished into several Sorts; 1. Some may be called *simple Contusions*, that is, when only the soft external Parts are injured: Some are *compound*, when the internal or bony Parts also partake of the Injury. 2. So some Contusions are slight, some of great Consequence; others prove mortal, and in some Cases immediately. This depends upon the Cause of the Injury, and the Nature of the Part injured. 3. Lastly, some Contusions are so circumstanced, which is very wonderful, that the internal Parts should be violently affected, whilst the external Parts remain whole and unhurt; for we are experimentally taught, that a Man may receive a Blow with a blunt Weapon, or even with a naked Hand, upon the Head, Breast, or Belly, which shall occasion instant Death, though there shall appear no external Signs of Injury. See BOHNIUS *De Vulner. Letbal. Sect. I. Cap. I.* Differences.

III. Contusions are usually occasioned, 1. By violent Blows given with blunt Weapons, such as Staves, Bludgeons, or Stones, or a Bullet almost spent. 2. The same will happen from a Fall upon the Stones, or any other hard Body. 3. Contusions are occasioned by the Body being pressed between two Doors, by Presses, Screws, Mills, Wheels, and such like Machines: For, by Accidents of this Kind the Vessels are either entirely broken, or the Blood is violently squeezed out of them, Causes of Contusions.

IV. When the small Vessels and Fibres have been broken by a Contusion, the Fluids that were contained in them will be forced out: Hence will proceed Obstructions, Corruption, Inflammation, and Ulcers, or even Gangrene, and several other fatal Mischiefs, in Proportion to the Violence of the Cause, and the Nature of the affected Part. When the external Parts are contused, the Skin at the same Time remaining whole, the Blood will stagnate under it, and occasion red, black, and livid Spots, which we call a *Sugillation*: From whence arise several other Mischiefs; and if this happens near a Bone, a Caries, or a Fracture. What succeeds a Contusion of the soft Parts.

V. When a bony Part is the Subject of a Contusion, then, 1. The same Mischiefs will ensue from the Injury inflicted upon the *Periosteum*, which we have already described as happening to the *Pericranium* in Wounds of the Head. But when this Disorder, 2. Is accompanied with a Fracture, the same Mischiefs will ensue, which usually attend fractured Bones, and these always increase in Proportion to the Force of the Blow; on which Account the Contusions from Bullets, &c. are generally attended with the worst Consequences. If the Injury is in the Bones of the *Cranium*, the *Thorax*, or the *Vertebra*, you may expect all the Mischiefs, of which we have largely spoken above in the preceding Chapters. Lastly, 3. When the medullary Juice of the Bones is affected, you Of the Bones.

P may

may expect every violent Disorder, whether the Bones are fractured or not. For the Blood which is discharged out of the Vessels that are sent to the *Medulla*, will presently corrupt and produce a Gangrene; or, by corroding the Bones, bring on a Caries, Ulcers, and incurable Fistulæ; which will make it necessary to take off the Limb to save the Life of the Patient: For the medullary Juice is in the same Condition in these Cases with the Brain in Fractures or Contusions of the *Cranium*.

Of the Joints
and Muscles.

VI. Contusions of the Joints usually bring on violent Pains and Inflammations, Convulsions, Gangrene, Sphacelus, Rigidity of the Limbs, and Caries. The same will sometimes happen from Contusions of the muscular Parts. When the internal Parts are contused, great Mischiefs usually ensue, but that depends entirely upon the Nature of the injured Part, and the Degree of the Injury: Sometimes Inflammations, Rupture of the Vessels, Varices, Aneurisms, Hæmorrhages, Stagnation of the Fluids, Corruption, Gangrene, Suppuration: And sometimes, as a necessary attendant upon these, Death. When the Head receives a considerable Contusion, the Senses are then taken away, the Limbs become either convulsed or rigid, and Death presently follows, in the Manner we have already explained, treating upon Wounds of the Head. If a violent Contusion falls upon the Thorax, a Difficulty of Breathing follows, with spitting of Blood, fainting Fits, Inflammation, and Ulcers of the Lungs, which usher in Death. After Contusions of the Abdomen you may expect vomiting of Blood, Inflammations, Suppurations, or Gangrene of the Viscera, and at length Death^a. If any internal Vessel is burst by the Violence of a Blow, it is no Wonder if the Patient dies upon the Spot, though there be no Mark of Violence left upon the external Parts. Lastly, if the Eye is contused, Tumor and Inflammation will succeed, and frequently Loss of Sight.

How to discover the
bruised Parts.

VII. Contusions may be examined, 1. By the Eye, when they are inflicted upon the external Parts of the Body: Tumors are formed, the injured Parts are discoloured, at first becoming red or black, then livid, yellow, green, and at last black again. If the Contusion is not very considerable, the Parts will of themselves recover their natural Colour. 2. When the Contusion is not within the Reach of the Eye, you must feel for it: An unnatural Softness of the Limb, or a Fluctuation of the extravasated Blood under your Fingers, will pretty clearly point out the injured Part to you. 3. Pains and Rigidity of the contused Part will make the same Discovery. Lastly, 4. You may form some Judgment of the Degree of the Injury received, from considering the Manner in which it was given, and the Size and Nature of the inflicting Instrument. You will judge what internal Parts are injured by the Symptoms which succeed, and by observing which of the Functions of the Body are disturbed or destroyed. If a Fracture attend the Contusion, it will easily be discovered by the Eye, the Touch, and the Ear.

^a An Instance of this Kind happened in the Year 1726, at a Village near *Helmstadt*; a School-Master there beat one of the Children very smartly, with a Stick of no great Size, but the Boy died in a few Days afterwards; upon opening him, the Viscera of the Abdomen appeared grievously bruised and lacerated. I opened another Boy soon afterwards, who was killed by a Blow, and found his Liver divided quite through the Middle, though there appeared no external Injury. Consult here the Quotation from BOHN, in the preceding Page. In the Year 1738, a Boy's Spleen was torn by the Kick of a Horse, and the Cavity of the Belly found full of Blood.

VIII. What we have said above concerning the Nature and necessary Effects Prognosis. of Contusions of each particular Part, will give the Surgeon great light in forming his Prognostic: Nevertheless, it will not be improper to subjoin a Rule or two in this Place. Slight Contusions are attended with little or no Inconvenience or Danger, besides discolouring the Skin: And even that Deformity is of a very short Date; for the stagnating Blood is presently licked up again, and the Spots vanish. But in larger Contusions, where there is a great Collection of stagnating Blood in the muscular Parts, an Abscess, Gangrene, or Sphacelus will easily follow. Contusions of the internal Parts are extremely dangerous; and the Degree of Danger encreases in Proportion to the Violence of the Contusion, and the Consequence of the Part in performing the necessary Offices of Life. If instant Death does not happen in this Case, yet it is usually attended with such dangerous Inflammations, that the Patient consumes away by Degrees, and very rarely escapes. Contusions of the Bones, particularly of their *Medulla*, and of the Joints or Ligaments, are very dangerous, especially those which are inflicted by Gun-shot: But the Contusion or Fracture of the *Cranium* from the Vicinity of the Brain, and of the Bones of the Thorax from their near Relation to the Heart and Lungs, exceeds the rest in the mischievous Consequences which attend it, as we have largely enough explained above.

IX. Your principal Care in the Cure of Contusions ought to be to divide the inspissated Fluids, and at the same Time to prevent the Parts from suppurating, Cure of slight Contusions. and being affected with Gangrene. There are several Methods successfully used for the Cure of slight Contusions. For Example, when a Tumor arises in the Forehead from a Fall, which very frequently happens to Children, it will easily be cured by fomenting it *cum Vino calido, Spiritu Vini vel solo, vel camphorato, Aquâ Reginae Hungariae*; or by applying cold Water or Vinegar mixed with Salt to the Part; or by clapping a broad Piece of Money, or a Plate of milled Lead upon the Tumor, and fastening it on with a very tight Bandage. Persons of slender Circumstances may find easier and cheaper Remedies; nor will they be balked in their Expectations, if they apply Linen Rags dipped in fresh warm Urine to Tumors of this Kind.

X. Larger Contusions may be dressed with Decoctions *ex Scordio, Sabinâ, Abrotano, vel scorfim vel junctim, in Vino, vel Aquâ falsâ*, repeating them warm with Linen Cloths, and with the medicated Bags. You will find great Benefit by applying a Sponge dipped in *Decocto Saponis Veneti in Urinâ recenti*. Your End also will be sufficiently answered by Applications of *Spiritus Frumenti*, or *Aqua Calcis, cum admixto Spiritu Vini camphorato, vel Acetum Lithargyrifatum, item Acetum cum semine Carui coctum*. These Remedies are all to be applied warm. Of larger Contusions.

XI. When the Contusion is so violent, that it is apparently impossible to divide the stagnating Fluids, and return them into the Circulation; and the Parts are hastening to become Gangrene, you must scarify them without Delay, carefully avoiding the larger Trunks of the Vessels. By this Means you will set the stagnating Fluids at Liberty, and prevent dangerous Consequences, as Tumors and Inflammations, Suppuration and Gangrene: And the Cure will be easily effected. Of violent Contusions.

XII. Having done this, you are in the next Place to apply proper Fomentations, or medicated Bags, made in the Manner we directed in Chap. XIV. What is farther to be done.

N. 10. or according to the following Prescription. *R. Rad. Bryoniae ℥ij vel ℥iij. Herbae Sabinae—Scordii—Abrotani, Arboris Vitæ, five Thuyæ vel Absinthii ana, Mij. Singula ista minutim dissecantur, affusisque Vini circiter Libris duabus, per Horæ quadrantem probè decocta, per panniculum laneum procolantur. Debinc Saponis Veneti vel Hispani aliquot Unciæ huic decocto probè calido admiscantur, complicatique panniculi Lanei ex eodem expressi per singulas ferè Horas læsæ Corporis parti calidè superinjiciuntur.* Rub the Tumor well with hot Cloths before you foment it, which will keep the Blood in its fluid State: Or, if it is already con-creted, it will divide it, and make it fit to return into the Vessels, or at least to escape through the invifible Pores of the Skin. If you cannot be supplied with Wine to make your Fomentation, you must use salt Water; which, if you are not near the Sea, you may make of common Water two Pints with the Addition of a handful of Salt. If any one is better pleased with the Form of a Cataplasm, he may prepare a very cheap, and no less useful one in the following Manner. *R. Pulver. Radic. Bryoniae, Saponis Veneti ana ℥iij. coq. in Aquæ recentis vel Aquæ falsæ q. s. ad Consistentiam Cataplasmati.* This will have still greater Efficacy if you add *Gummi Galbani vel Ammoniacci ℥j. in Vitell. Ov. q. s. solut.*

Of internal
Remedies
and a proper
Diet.

XIII. Where the Contusion is of any Consequence, you should never neglect the Administration of internal Medicines: And here your Intention is to promote the Discharge of Sweat and Urine, by prescribing, dividing, and attenuating Decoctions and Infusions to be drank plentifully. These may be prepared *ex Theâ, Betonicâ, Veronicâ, Salviâ, Rorismarino, Ligno Sassafras, Herbâ Arnicâ, vel Petroselinî Radicibus.* The Efficacy of these Medicines in dividing inspissated Fluids, is scarcely to be conceived, especially if you now and then add to a Draught of one of these Infusions a Drachm of Venice Soap. You will find no less Assistance from the *Pulvis ad Casum, Augustanorum*, or from *Sperma Ceti, vel solum vel cum admixtis Sanguine Hirci, Mumiâ, Cancrorum Lapidibus, in Pulverem redact.* These may be given to a Drachm at a Dose, in a Draught of any of the former Infusions. In plethoric Habits you should never forget to open the Vein, and repeat it as often as you are threatened with an approaching Abscess or Gangrene: The Patient must abstain from Flesh and strong Liquors, living wholly upon Broths and thin Spoon-meat.

What still
remains to
be done.

XIV. The Fluids that were collected together by the Contusion being pretty well dispersed by the Methods we have recommended above, the remaining Part of the Cure that principally regards the Wound, (which frequently accompanies this Case) is easily performed, by filling it up with Pledgits spread with a digestive Medicine, and laying on a warm Plaster over the Dressings: Which will save the Surgeon the Trouble of preparing Cataplasms and Fomentations for this Purpose, and answer his End as well. The *Emplastra Diasaponis, Diachylum, de Melito, de Spermate Ceti, de Galbano*, all answer this Intention; or if you please you may use the following *R. Empl. de Meliloto ℥iv. Galban. puri solut. ℥ij. Farin. Rad. Bryon. ℥j. Flor. Sulphur. Æthiop. min. ana ℥ss. Ol. Chamæmel. q. s. M. f. Emplastrum.* In the mean Time the Regimen which we directed above, both with regard to Medicine and Diet, should be strictly observed. The most dangerous Contusions are cured in this Manner, much easier than by Suppuration or Scarification. Having answered the Intention of dispersing the stagnating Fluids, and cleansing the Wound, nothing remains but

to forward the Union of it by Applications of the vulnerary Balsam, and at last dry Lint, as we have already advised for healing other Wounds.

XV. It sometimes happens, when the contused Parts lie very deep, or the Surgeon is ignorant of his Business, or the Patient refuses to submit to proper Treatment, that the stagnating Fluids will corrupt and suppurate. When the Suppuration is begun, it must be forwarded, 1. By emollient Cataplasms prepared *ex Rad. Malv. Althææ, Liliorum Alborum, Herbis Malvæ, Althææ, Parietariæ, Mercurialis, Brancæ Ursinæ, Meliloti, Verbasci, Ficus, Lini Semine, Fænogræco, Farinis Variis, Micis Panis cum affuso Aquâ vel Lactē coctis ad Pul-ticulam, Butyroque, Adipe, Oleisve emollientibus, Lini scilicet, Chamemela, Li-liorumque Oleis dilut.* These are to be applied to the Part as hot as they can be well born. 2. Sometimes in this Case it will be proper to mix warm Medi-cines with Emollients, such as *Cepæ sub Cineribus tostæ, Fermentum Panis, va-ria Gummata, Galbanum scilicet, Ammoniacum, Bdellium, Opoponax in Vitell. Ov. soluta.* These are to be mixed with the emollient Ingredients which we enumerated above. For Example, *R. Herbæ Malvæ, Althææ, Parietariæ, Meliloti ana Mi. concisa coquantur in Aquâ simplici q. s. adde Consistentiam Ca-taplasmatiss.* *Adde Ceparum sub Cineribus Assatarum, ℞iv. Galbani, Vitell. Ov. solut. ℞ii, Ol. Lilior. Albor. ℞iſs, Farinæ Sem. Lini q. s. ad Consistentiam.* These Applications are to be repeated till the Suppuration is thoroughly formed. In small Contusions the *Emplastrum Diachylon cum Gumm.* will sufficiently answer this Intention.

XVI. When the Whiteness and Softness of the Tumor evidently discover that the Matter is thoroughly formed, and fit to be discharged, you may lay open the Part with your Knife, and afterwards digest and heal the Wound in the same Manner as we have frequently directed above. If it breaks of itself, it should be treated in the same Manner. Where the Aperture is too small, it must be enlarged with your Knife, that it may be easier cleansed, and more conveniently healed.

XVII. Large Contusions are sometimes attended with violent Inflammation or Gangrene; in this Case make frequent and deep Incisions upon the Part, and dress the Wounds *cum Theriacâ Spiritu Vini Camphorato dilut.* applying warm Fomentations externally, not omitting the internal Medicines prescribed at N. XIII. (but I shall treat more largely upon this Head in a Chapter upon Gangrene and Sphacelus.) When a Sphacelus is begun, if it is only in the common Integuments, you must apply Scarification, a digestive Ointment, Medicines that resist Gangrene, and Suppuration. But if the whole is sphacelated, that is, entirely corrupted and mortified, the Limb must be entirely taken off, in the Manner we shall shew you when we come to describe *Chirurgical Operations.*

XVIII. When the internal Parts are contused, unless the Patient has im-mediate Assistance, Inflammations, Suppuration, and Gangrene instantly ensue; which soon terminate in Death. Therefore, in these Cases, the Surgeon should endeavour to dilate and attenuate the concremented Blood with the utmost Expe-dition, by frequent Blood-letting, by gentle opening Medicines and Clysters, Chap. XIII, N. XXXVII, by prescribing the warm Decoctions and Infusions which we directed above at N. XIII. If the Disease is curable, these Methods will pre-vent Suppuration or Mortification. These Parts do not admit of Incision, and the Use of absorbent Powders, such as *Lapides Cancrorum, Sanguis Hirci, Cornu Cervi,*

Carvi, Pulvis ad Casum, and the like, is trifling in this Case. We have already sufficiently explained how Contusions of the Head in particular ought to be treated, in the preceding Chapter. But in Contusions of the Breast, or the Belly, you can direct nothing better externally than a Compress, steeped in Spirit of Wine camphorated, or a Bladder filled with warm Milk, in which the Flowers of Chamomile or Alder have been boiled. Apply these continually warm to the Part affected. For further Applications, consult the Method laid down for the Treatment of Wounds in these Parts.

Contusions
of the Eye.

XIX. When the Eye, that most noble and beneficial Organ, is contused by any Accident, it will swell immediately, and be entirely deprived of Sight, except the Contusion is very small, and proper Remedies are instantly and carefully applied. If the Eye therefore has received a slight Contusion, you may wash it frequently, for the first Day, with cold Spring Water, covering it with Linen Rags, wet with the same: On the next Day, rub it externally *cum Spiritu Vini camphorato*, covering it with Stuphs wrung out of vinous Decoctions *ex Euphrasia, Veronica, Hyssopo, Salvia, Florib. Chamamel. & Semin. Fenicul.* If you cannot get these Herbs, you may apply Bolsters, dipped in *Vino calido*, renewing them often. If the Contusion is large, or the Patient of a plethoric Habit, you should open a Vein. On *Bloodshot Eyes*, see CELSUS, pag. 369.

Of violent
Contusions
of the Eye.

XX. If the Contusion of the Eye is so violent, that you can plainly see the extravasated Blood through the *Cornea*, and all Objects appear red to the Patient, open a Vein either in the Foot or Neck, as you shall think most convenient, and repeat it, if necessary: Foment the Eye with Stuphs wrung out of the Decoctions which we prescribed above, and order him to bathe his Feet in warm Water two or three times in a Day, advising him also to observe the same Regimen with regard to Diet and internal Medicine, which we described at N. XIII. By the strict Observation of these Rules he will recover his Sight, if the Disorder be not become desperate, especially if you frequently drop warm Pigeon's Blood into the Eye. If these Attempts to disperse the stagnating Blood are frustrated, you may very probably succeed by making an Opening in the *Cornea* with y Lancer. The Manner of doing this to Advantage you will find described in Chap. LX, and LXI. of the *Second Part* of this Work, which treats professedly of *Operations*.

CHAP. XVI.

Of VENOMOUS WOUNDS, and those that are made by the BITES OF ANIMALS.

Poisonous
Wounds are
difficult to
distinguish.

I. **W**E are informed by antient Tradition, that the *Indians*, and the barbarous Nations all over *Africa*, used to poison their warlike Weapons, to aggravate the Wound, and destroy their Enemies with greater Certainty; which some of them continue to this Day. This Custom has long ago been laid aside by the *Europeans*, as inhuman. Wounds that are inflicted by Weapons of this Kind, are attended with extreme Danger: For, as this Sort of Mischief is in a great Measure concealed and unexpected, there is no Room to make

Chap. XVI. Of VENOMOUS WOUNDS.

III

make use of proper Precautions to prevent or remedy the Evils that will ensue from it.

II. For though several *Physicians* and *Surgeons* have asserted, that you may distinguish Wounds made by a poisonous Weapon, not only by the filthy Stench of the wounded Parts, and the unusual Colour of the Discharge that proceeds from them, to wit, yellow, green, livid, and black; but particularly by the Increase of Pain, by the extravagant Degree of Tumor and Inflammation that they are attended with; Palpitation of the Heart, Swooning, Spasms, Distortion, or Rigidity of the Limbs, cold Sweats and Shiverings, with which the Patient is constantly afflicted in this Case. Nevertheless, if I may be allowed to judge, I must determine these Symptoms to be altogether doubtful and uncertain. For what Surgeon does not know, that all these Symptoms may be brought on either by the bad Habit of the Patient, or from the Nature of the wounded Part, if it is nervous or tendinous; or, in a word, from an hundred other Causes, where Poison is no ways concerned?

For the
Marks of
them are ve-
ry uncertain.

III. You have much greater Certainty of a Mixture of Venom in the Wound, ^{or Bites,} when it is made by the Bite of a *venomous* or *mad Animal*, (for there is scarce any Species of Animals but what is at some times subject to Madness) especially of a Dog, a Cat, a Wolf, an Ape, a Man, a Serpent, a Scorpion, or of any other venomous Insect. But since the Coldness of our Climate renders us very rarely subject to Injuries from the Bites of venomous Serpents, or indeed of any other venomous animal but a *mad Dog*, it will be most to our Purpose to treat chiefly of that Subject; at the same time not entirely neglecting the Description of other Wounds inflicted by Biting. And first we shall speak of the Bites of Animals which are not mad.

IV. Bites of enraged Animals are attended with very grievous Consequences, though they are not afflicted with Madness. <sup>Bites of Ani-
mals which
are not mad.</sup> ^a CELSUS has long ago taught us, that the Bites of a ^b Man, an Ape, a Cat, a Dog, or of any wild Beast or other Animal, frequently bring on terrible Mischiefs. In that Passage of his where he says, *Omnis c ferè morsus quoddam virus habet*, “Almost all Bites whatever have something poisonous in them.” He is not to be understood as if he had asserted, that all Wounds, made by Bites, have actually some Particles of Poison, properly so called, instilled into them; but rather as speaking of the bad Symptoms which must necessarily ensue from the violent Laceration and Contusion of the Muscles, Nerves, Tendons, Ligaments, and Bones, by the Bite of a large Dog, a Horse, a Wolf, or a Bear, or any other large Animal. If the Wound is slight, encourage the Discharge of Blood from the Part, by pressing it with your

^a *Lib. v. Cap. 27. N. 1.*

^b PANAROLI *Pentec. 2. Obs. 42.* HILDANI *Cent. I. Obs. 84, & 85. ac De morfu equi*, *ibid.* *Cent. II. Obs. 86.* SEREN. SUMMONIC. *Cap. De hominis & simiae morfu.*

^c In several Editions of CELSUS you will find *FERÆ* for *FERE*, *Omnis autem FERÆ morsus quoddam virus habet*; but I think the other Reading preferable to this; for CELSUS does not treat in this Place of the Bites of wild Beasts alone, for they are very uncommon Cases, but of the Bites of a Man, an Ape, and particularly of a Dog, (which Animals he manifestly distinguishes in this Place from wild Beasts) which Bites he describes as bringing on violent Mischiefs, especially if the Animal is much enraged. Therefore CELSUS very properly, in an extensive Sense, declares, *Omnem FERÆ morsum habere quoddam Virus, sive Venenum*; which Opinion is not applicable to wild Beasts alone, but to all Animals whatever, for Reasons which we shall presently lay down. MORGAGNI is of the same Opinion with me concerning the Interpretation of this Passage, which he explains, according to his usual Custom, with great Learning and Perspicuity. *In Epistol. in CELSUM, pag. 126.*

Fingers,

Fingers, sucking it with your Mouth, or by the Application of Cupping-glasses, or by enlarging the Wound with a Lancet: Wash it afterwards with warm Wine, or camphorated Spirits of Wine, and apply Bolsters to it dipped in the same Liquor, repeating it every three or four Hours till all Danger of Inflammation is gone off. CELSUS recommends Salt, as the best Remedy for the Bite of a Dog, if it is applied dry, and well rubbed in. It is afterwards to be healed with the Oil of Turpentine, or some vulnerary Balsam. If the Wound is very considerable, it will be absolutely necessary to enlarge it with the Knife, unless the Opening is already very large. The Discharge of Blood also should be encouraged in this Case, by the same Methods which we advised in the foregoing; and you should open a Vein to prevent a dangerous Inflammation. I lately saw the bad Effects of a Neglect of this Practice, in the Case of a Boy who was bit by a Dog near the Knee, and was seized with a violent Inflammation over the whole Leg and Thigh, for want of a proper Evacuation of Blood. The Wound should be diligently washed with Wine, warm Spirits of Wine, or salt Water, dressing it up with Lint and Linen Bolsters wet with the same Liquors: These Dressings are to be repeated frequently every Day, to prevent a violent Inflammation. You may dress afterwards with Honey, or a digestive Ointment, and heal with a vulnerary Balsam, as in other Wounds.

How to
know a mad
Dog.

V. In order to know whether your Patient has been bit by a mad Dog, it is necessary that we should first settle the Marks by which a mad Dog is distinguishable from other Dogs. When a Dog is mad, he foams at the Mouth, and lolls out his Tongue, claps his Tail betwixt his Legs, and runs up and down without ceasing, as if he was pursued; he makes a hoarse Noise when he barks, and is afraid of all Animals that come in his Way, snapping at every thing he meets, even at his own Master, upon whom he used to fawn: Other Dogs are afraid of him, and avoid him.

Mischief
that ensue
from the
Bite of a
mad Dog.

VI. Men that are bit by a mad Dog are usually afflicted with grievous Disorders, sometimes sooner, sometimes later, in Proportion to the Malignity of the Poison that is imbibed by the Wound, and to the Patient's Habit of Body at the time he receives the Bite. When once the Poison begins to exert itself, the Patient is seized with great Anguish, continual Groanings, Sighing, acute Pains, and Fevers.

Prognosis.

VII. If nothing is done to relieve this Disorder, he is seized with a *Hydrophobia* about the ninth Day, a miserable Circumstance! since he is continually afflicted with Thirst, and at the same time labours under such a Dread of all Fluids, that he durst not satisfy it, but rages and foams like a Dog, till being quite spent, he expires. Therefore in this Case it well behoves us to be early in our Applications to Wounds of this Kind; for when the *Hydrophobia* appears, nothing is to be looked for but certain Death^b.

How the
Wound is to
be treated.

VIII. Where shall we find a Remedy for this dreadful Disorder? Many are of Opinion, that to push a Man unawares into a Pond or River is a certain Cure;

^a There have been several Instances where the Poison has lain dormant in the Blood for one, two, nay for several Years, and has at length broke out, and carried off the Patient after the usual Manner. WEBSTER has given us several surprising Relations of this Kind in his Book *De Magia*.

^b It will be worth your while to consult VERDRIES upon this Subject, in *Lib. De æquilibrio ment. & corpor. circa finem*. And MARESCOTTUS *De Variolis*, pag. 57. where he treats of the *Hydrophobia*.

this was a common Remedy in the Times of CELSUS, *Lib. V. Chap. 27.* Some think it sufficient to bathe the wounded Limb frequently in cold Water for several Days together, and to dress the Wound with some of the mad Dog's Hair: They imagine this last Method cures a Man by *Sympathy*, as they affect to call it. Others, as CELSUS advises, throw the Patient into Water when the *Hydrophobia* is coming on, and endeavour to force him to drink against his Will; for by this Means, they assert, that they take off his Thirst, and the Dread of Water at the same time. On the other hand, almost all the most experienced Surgeons recommend the following Method as the safest and most worthy to be tried: To enlarge the Wound with the Knife, to promote the Flux of Blood, to cleanse it *cum Aquâ salsâ, vel cum Aceto, vel Spiritu Vini & Theriacâ*, and to endeavour to draw out the Poison by Cupping-glasses: And, lastly, if the Texture of the Part will permit it, that is, when only the common Integuments or fleshy Parts are wounded, they apply the actual Cautery to the Wound, and dress it afterwards like other Burns. But if the Part affected will not admit of the Cautery, the Wound must be enlarged by Incision, then dressed with Vinegar and Treacle, and covered with a Bolster dipped in the same Ingredients: And to prevent Inflammations and a consequent Fever, a Vein should be opened (especially in plethoric Habits) agreeable to the Practice of the Antients. See CELSUS, *Lib. V. Cap. 27. N. 2.* AQUAPENDENS, in *Operat. Chirurg. pag. 331.* advises this Method to be used to all Wounds that are infected with Poison: But in these last Cases you should first diligently enquire, whether the Arrow or other Weapon, by which the Wound was inflicted, was poisoned or not, or whether the Violence of the Symptoms give you sufficient Reason for such Conjecture. For where it remains doubtful whether the Weapon was poisoned or not, you should deal more tenderly with your Patient, and not proceed to the Use of the actual Cautery, but treat the Wound after the Method just described.

IX. KOEMPFER, who was one of the chief Physicians in the *Eastern Countries*, and well versed in the Nature of the venomous Serpents, with which that Part of the World abounds, tells us in his *Amœnitat. Exotic. pag. 581.* and in his *Itiner. in Chinam & Japan*, that he has frequently cured the Bites of these Animals without the Help of the Cautery, by making a Ligature upon the Limb above the injured Part, and scarifying the Wound, anointing it well afterwards *cum Theriacâ*, and covering it with a Cataplasm made of the same Medicine, giving also a Dose of it frequently by way of Sudorific. He declares, that he never lost a Patient, where he had an Opportunity to treat him in this Method. As this is a simple, easy Method, and proves by Experience to be a very safe one, I see no Reason why we should not prefer it to one attended with great Cruelty and Pain in the Operation. Yet this Method may be found less effectual in curing the Bites of *European Serpents*.

X. Some anoint the Wound with the *Oleum Nucis Moschatæ* instead of the *Theriaca*. Others apply a Toad to the Part, either alive, or dried and softened with Vinegar, imagining that this Animal has a specific Virtue in extracting Poison from a Wound. Others again are extremely fond of the *Ophites*, or serpentine Stone, called *Pedro del Cobra*, which they are told is found in some Species of Serpents in the *Indies*. They affirm, that if you lay this Stone upon a Wound made by the Teeth of a venomous Serpent, or Viper, it will imbibe all the Poison, and if you afterwards soak it in Milk, it will deposit it in that Fluid. Compare

pare with this Place, KOEMPFER, in *Amanitat. Exotic. pag. 57, & seq.* though he only advises it *contra Serpentum ictus*; but the celebrated VALLISNERIUS, in his Book *De Generatione, p. 141.* denies that it is equal to the Cure of a Bite from an *Italian Viper*; therefore, I think, very little Credit is to be given to it. The following Cataplasim is in great Reputation with some for this Intention, *R. Cepæ sub Cineribus assatæ, & Allii Bulbum unum, Theriacæ, Fermenti Panis Valentissimi ana ʒj. Sinapi ʒss quæ singula infuso aceto calido in formam Cataplasmatidis probe conteruntur, Vulnerique superimponuntur.* Dr. MEAD recommends Viper Fat as a certain Remedy for the Bite of a Viper: And since that, Olive Oil has been in the highest Esteem.

The rest of
the Cure.

XI. In a Day or two after your Patient has been bit by a mad Dog, the Wound should be dressed *cum Melle vel Unguento digestivo admist. Ung. Ægyptiaco, vel Mercurio Præcipitato Rubro bis quotidie.* It may be kept open with these Dressings for some Weeks, or for about forty Days, till the Poison is thoroughly discharged. You should always be very careful not to heal Wounds of this Kind too soon, especially where they have not been cauterised; for the principal Part of the Cure in these Wounds consists in keeping the Part open, and encouraging a Discharge: Wherefore CELSUS always recommends very stimulating Medicines.

The inter-
nal Method.

XII. Besides the external Remedies that we have advised, it will be proper to prescribe strengthening Medicines and Sudorifics to be given internally, according to the Strength of the Patient. Some of the Antients, according to CELSUS, put the Patient into a warm Bath, and sweated him there as long as he could bear it, with the Wound uncovered, that the Poison might distil out in greater Quantities, washing it well afterwards with Wine, which is an Enemy to all Poisons. When they had repeated this Process for three Days, they thought him out of all Danger. It would be very convenient in this Case to give him now and then a Glass of Wine inwardly, and a Spoonful or two of good Wine-Vinegar, in which some Sage had been boiled, with a Drachm of *Theriaca* in it; and between Meals to administer Draughts of *Infusum Scordii vel Salviæ in Aquâ calidâ*, putting the Patient into a warm Bed, or into a Bath, to encourage him to sweat largely: This should be done for several Days successively. You may give, for several Mornings, *Valerianæ Radicis ʒj.* in the room of *Theriaca*, which I find is much the Practice in *Italy*; or *Radix Gentianæ*, in the same Quantity, with a Draught of one of the Infusions which we just now prescribed. Some, after the Example of GALEN and BOYLE, instead of *Theriaca*, give *Sal volatile Viperarum, vel ex Cancro Fluviatili combusto paratum*, which they have so great an Opinion of, that they venture to affirm it to be an *infallible Specific* in this Case.

XIII. Several amongst the Moderns recommend the *Scarabæus Maialis melle conditus & tritus, vel Scarabæi Succus*, which they suppose to have very great Efficacy in destroying Poison, and preventing its bad Effects, if it be repeated for some Days. Others have no less Opinion of the Virtues of the Heart, Liver, or Brain of a mad Dog or Wolf, which they affirm to have very salutary Effects, if given to the Patient in Time; but for many Reasons I think this by no means a justifiable Practice. PARÆUS directs *Garlic* to be given frequently. But I think the moderate Use of some generous Wine, and the Juice of Citrons and mild acid Fruits, or Wine-Vinegar, either simple, or mixed with Honey, will be

of

of great Service, not only in strengthening the Patient, but in destroying the Poison.

XIV. The same Methods of Cure which we advised above, N. VIII, and XIII, will be serviceable against the Stings of *Scorpions*, or other venomous Animals. The Scorpion affords an easy Remedy against his own Sting; for some bruise him and lay him upon the Wound; others drink him in a Glass of Wine. See CELSUS, *Lib. V. Cap. 27. N. 3.* where he says, *Venenum Serpentis non gustu, sed in vulnere nocet.* Some dress the injured Part with Oil of Scorpions, which they esteem a sure Method of Cure. Others do nothing but draw Blood from the Arm. The Antients in this Case hired Men to suck the Blood and Poison out of the Wound, which they did, spitting it out again, without injuring themselves in the least. See the above cited Passage from CELSUS: But the Patient at the same time did not neglect the Use of the Methods which we prescribed above, both with regard to internal and external Medicines and Applications. The best Cure for the Sting of Bees or Wasps is, *Acetum cum Theriacâ*, or *Theriaca cum Spiritu Vini*, or *Bolus Armena cum Aceto*. The Method of Curing a Gangrene arising from the Bite of a Horse, may be seen in HILDANUS, *Cent. ii. Obs. 86.*



INSTITUTIONS OF SURGERY.

PART II. BOOK II. Of FRACTURES.

CHAP. I. Of FRACTURES in general.

Fractures,
what.

I. **U**NDER the Name of *Fracture*, speaking in general Terms, we conceive every Solution of Continuity in the Bone, either from an internal or an external Cause, whether the external Cause was a sharp or blunt Instrument. But as we usually call those Injuries of the Bone that are brought on by acute Instruments *Wounds of the Bone*, so we properly call those *Fractures of the Bone*, where the Bone is broken by the Force of a blunt Instrument. Therefore Fractures generally happen when any Part of the Body where a Bone is situated receives a violent Shock, either by a Fall, by Jumping, or a Blow with a Piece of Timber, a Stone, or by a Shot from a Gun. There are also Instances where this Accident has happened from an internal Disorder, to wit, from the Scurvy, a Caries, or the Venereal Disease, which have rendered the Substance of a Bone so brittle, that it has been fractured without any apparent external Accident. See CELSUS, L. viii. C. 1. MARCELL. DONATUS *Hist. Med. L. iv. C. 5. ex* PANDOLPHINO, p. 272. CONNOR, *Diff. Med. Phys. de stupendo Ossium coalitu*, pag. 11. *Fractura Ossium a Causâ internâ mirabilis*. SAVIARD, *Obs. LXII. HEYNE De Ossium Morbis, N. XXIX.*

Different
Species of
Fractures.

II. We may distinguish Fractures into several Classes or Species. First, every Fracture is either *simple*, that is, when no other Parts beside the Bone are injured; or *compound*, that is, when you have at the same time a Wound, a Dislocation, Hæmorrhage, Inflammation, Fever, Caries, or Contusion of the Bone; or where the Bone appears to be fractured in several Places, or more than one Bone, at the same time. Other Differences arise with regard to the Situation of the Fracture: Sometimes it happens in the Cranium, Ribs, Clavicles, Vertebrae; sometimes in the upper or lower Limbs; sometimes in the Middle of the Bone; sometimes in either of the Extremities. Again, some Fractures

Fractures are transverse, others oblique; in which Case it frequently happens that the Points of the Bones wound the neighbouring Parts, pushing quite through the muscular Flesh and common Integuments, or at least pricking them grievously, and bringing on Pain, Inflammation, Tumor, and Spasms. Violent Contusions also may be classed under the Head of Fractures; for the Bones in this Case are frequently broke into Splinters by the falling of any heavy Body upon the Part, or by Fire-arms, or the Pressure of Mill-wheels, or the Wheels of Carriages.

III. To Fractures of the Bones we may very properly add *Fissures*, when the Bones are divided either transversely or longitudinally, not quite through, but cracked after the Manner of Glass, by any external Force: For although most Surgeons have looked upon the mention of Fissures as an idle Jest, especially of those that are said to be made in a longitudinal Direction, and others have passed them over silently in their Writings, or where they have by Chance been mentioned, no Method of Cure has been directed for them: Yet there is not one of them that I know of, who was ever able to demonstrate the Impossibility of these Fissures; since they often happen in the *Cranium*, and indeed in other Bones. All they can pretend to alledge is, that they have never fallen under their Observation; but I find Instances of this Kind of Disorder, with a Method of Cure described for it, in Authors of undoubted Credit. See HEYNE *De Morbis Ossium*, N. XXIX. and particularly that famous German Surgeon FELIX WURTZIUS, in *Chirurg. Part II. Cap. 28.* which makes me so far from calling the Fact in question, that I think it ought rather to be a Spur to a young Surgeon to consider well the Marks that WURTZIUS has described, and to make a more diligent Search after Cases of this Kind, than has hitherto been made. We shall speak more largely to this below.

IV. It is no difficult Matter to examine *Fractures of the Bones*, 1. *By the Eye*, when the Pieces appear through the Skin, when the injured Part is apparently shorter than the sound, or when you see that the Patient cannot make Use of it. 2. *By the Touch*, when you perceive a præternatural Inequality of the Bone, or that it bends in a Part where Nature never intended it should; and here, by the way, we must recommend it to the Surgeon, if it be possible, to fix the Patient immediately, at the first searching of the Fracture, where he is to lie, during the Course of the Cure. 3. *By the Ear*, when we hear the Ends of the broken Bones crush against each other upon moving the Limb. But, 4. We may strongly suspect a Fracture of the Part, when it has received a Blow with great Violence from a heavy Body. And, 5. We should not neglect to observe, that the Parts are more subject to this Injury in Winter, than in Summer. Lastly, 6. Sometimes, particularly in Fractures that are made in a transverse Direction, the broken Parts of the Bone will immediately of themselves recover their natural Situation, and leave very little room to suspect the Disorder. Therefore it is necessary to be very cautious and prudent in forming your Judgment in Cases of this Kind. If your Patient has entirely lost the Power of moving any Limb, or puts it in Action with the greatest Difficulty, after having received a violent Blow upon that Part; or if he feels violent Pain when you handle it, or move it for him, this affords great Reason to suspect a Fracture. But to make yourself more certain in this Case, it will be proper to take hold of the injured Limb with both your Hands, and ordering an Assistant at the same

Of Fissures
in the Bones.

How Frac-
tures are to
be discover-
ed.

same time to move it about, attend diligently whether you cannot hear the broken Ends of the Bone rub against each other, and observe whether you cannot discover a præternatural Dent or sinking in any Part of the Limb. The Motion that your Assistant makes should be done with great Care and Tenderness.

How to discover Fissures.

V. *Fissures in the Bones* are not easily detected; since neither your Senses of Seeing, Feeling, or Hearing can give you Light enough to determine any thing with Certainty in this Case: And this seems to be the Reason why most Surgeons are deceived in this Case, as GOVEIUS well observes in his *Chirurgie veritable*, pag. 79. If we will believe those Authors, who declare to us, upon their own Experience, that these Cases sometimes happen, we shall find there are sufficient Signs to discover a Fissure of the Bone. They always suppose a Fissure when you have such violent Pains after any external Violence, that the injured Part will not bear handling, and cannot support the Parts above it; when you have more than ordinary Tumor, and these Symptoms do not yield to the usual Applications. After this you are to expect violent Inflammations, Suppurations, Fistulæ, and Caries. These Authors are of Opinion, that aged Persons are most subject to this Disorder, because their Bones are very brittle. When we consider the Nature of a Fissure, we shall not be long in guessing whence all the bad Symptoms attending it can arise: For the Bone being once cracked, the Blood and Sanies which fills up the Vacancy will presently putrify and corrupt the Medulla, the neighbouring Parts, and at last the Bone itself, which will easily produce the Mischiefs we have described.

Disorders attending a fractured Bone.

VI. Great variety of Mischiefs attend a fractured Bone; which differ, 1. With regard to the injured Part, and the Nature and Disposition of the neighbouring Parts. 2. With regard to the Manner in which the Fracture is made; for oblique Fractures, and those whose Splinters or Points wound and vellicate the neighbouring Parts, are much more painful and dangerous than transverse Fractures. Fissures are attended with more or less Danger in Proportion to their Size, as appears from what we have delivered above. But, 3. We may judge of the Mischief that is likely to attend a Fracture, from the Number of Pieces into which the Bone is broken. And, 4. By observing whether the Fracture happens in the Middle of the Bone, or at either of its Extremities. The principal Inconveniencies that attend a Fracture, are these: The Patient loses the Use of the Limb, the lower Part of the Limb will be contracted by the Muscles, which will make it appear distorted and deformed. The Laceration of the *Periosteum*, and the Vessels of the *Medulla*, bring in great Danger of Fistulæ and Caries. When the Nerves are pricked and irritated by Splinters or Points of the broken Bone, the Patient suffers great Pain, Convulsions, Inflammation, and Fever. If any Vessels suffer Pressure, the Circulation of the Blood is retarded: Therefore no Wonder if Inflammations, Abscesses, Gangrene, and Death, are the Consequences: If the Pressure is upon a Nerve, the Part to which it was determined becomes Paralytic, losing both Sense and Motion, and by Degrees usually wastes. Sometimes, whilst the Bone is uniting, the broken Parts are supplied in too plentiful a Manner with Juices, and the Callus is formed irregularly, which occasions Deformity in the Limb. When you have a Wound in the fleshy Parts in Conjunction with a Fracture in the Bone, you will most likely be troubled with a violent Hæmorrhage: When the Blood-vessels are injured, the Skin remaining sound and unhurt, great Effusions of Blood, and dange-

dangerous Swelling and Suppurations, are the general and almost inevitable Consequence.

VII. The Surgeon ought to be very cautious in delivering his Prognostic concerning Fractures. He should avoid being too hasty in promising a quick, easy, and certain Cure, lest his Art should be overcome by accidental Disorders, and he be accused of Knavery or Ignorance. For I don't know how it happens, the most unskilful Persons in Surgery speak of fractured Bones, as Cases of the least Importance, and make nothing of promising a Cure: Whereas it is undoubtedly true, that it is sometimes impossible to restore a broken Limb to its former Shape and Strength, though your Surgeon is perfectly Master of his Art. Therefore since Fractures are sometimes cured easily, but at other Times are attended with the worst of Consequences, it will be an Argument of Discretion in a Surgeon to deliver his Prognostic in such a Manner, that it may not regard the fractured Part alone, but may give Warning also of the Accidents that are likely to happen to the neighbouring Parts, or which may be occasioned by the Age, or the bad Habit of Body of the Patient, or by any other Circumstances: And in this he should always take Care not to be over hasty.

VIII. I would recommend the following Observations to the Surgeon.

1. Simple Fractures, when you are called soon after the Accident, are much easier cured than Fractures that are complicate with an external Wound, a Dislocation, a great Contusion, an Hæmorrhage, a Caries, or with any other grievous Disorders.
2. Fractures are more easy or difficult of Cure, according to the Part on which they happen. Thus small Bones, such as the Clavicles or Ribs, or the Bones of the Fingers, are usually cured in twenty Days; the Radius, or Cubitus, in thirty; whereas the Os Humeri, or the Tibia, require from thirty to fifty Days; and the Os Femoris does not thoroughly unite till the sixtieth or seventieth Day.
3. Men of good Constitutions, and in the Prime of Life, are cured sooner, with less Trouble, than Persons of a bad Habit of Body, or advanced in Years.

IX. Where the Situation of the Bone is not altered by the Fracture; or the broken Parts start very little, they are much easier replaced, than where they are entirely separated from each other, and a great Space intervenes between them. Transverse Fractures admit of an easier Cure than oblique Ones. Fractures near the Articulations are attended with worse Consequences than those which are made above the Middle of the Bone: For where the Fracture happens near either Extremity of the Bone, the Joint frequently suffers, which occasions Loss of Motion in the Part, the Ligaments also and Tendons are usually bruised in this Case; from whence arise violent Pains, Inflammations, and Convulsions, and sometimes even Gangrene, and Death itself; or at best, the Patient must submit to an Amputation.

X. When two Bones of the same Limb are fractured, the Cure is more difficult than when this Accident happens only to one of them. When the Bone is broken into several Pieces, the Patient will seldom escape Abscesses, or even Gangrene or Sphacelus; that either the Limb must be taken off, or Death will ensue. At least the Cure will require a great deal of Time, and the Limb will never entirely recover its Shape. Therefore where a Surgeon sees this, he ought always to forewarn the Patient, or his Relations, what Danger he apprehends.

XI. Where the broken Bones are instantly reduced, your Cure will be performed with greater Ease, than where they have been for some Time separated.

Therefore

Therefore where the Surgeon is called a considerable Time after the Fracture has been made, he cannot promise to reduce the Bones easily, or to make a speedy Cure.

XII. When any Parts of great Consequence to the animal Œconomy are situated in the Neighbourhood of the Fracture, the Case will certainly be attended with great Danger, if not with Death. Such are Fractures of the Cranium, from Vicinity of the Brain; of the Vertebrae, from the Medulla Spinalis; of the Ribs or Sternum, the Ossa Ilei and Pubis, from the Situation of the Viscera of the Thorax, and Abdomen. Fractures also of the Bones to which the larger Arteries or Veins are connected, are very dangerous; more particularly when any Splinter or Point of the broken Bone vellicates or wounds a large Vessel: For very violent, if not mortal Hæmorrhages must necessarily ensue, especially when this happens in the Axilla or Groin, which is often the Case.

XIII. When the Ends of the fractured Bone break through the Muscles and common Integuments, you will find great Difficulty in reducing the Bone to its proper Situation, from the great Number of Muscles, Nerves, and Blood-vessels that lie in the Way: The Laceration of which will bring on great Mischiefs, and frequently Deformity and Weakness upon the Limbs, especially if it is the Os Humeri, Tibia, or Femur, so as to render the Amputation of it necessary.

XIV. The most temperate Air and Season of the Year is most convenient for the Cure of this, as well as all other Disorders. The Cure also succeeds more happily in Children and young Persons than with aged Persons. When Fractures happen to big bellied Women, they are seldom cured till they have got rid of their Burthen.

XV. When the Bone is broken into several Fragments, the Consequences are generally Inflammations, Suppurations, or Fistulae, which will not admit of any Remedy till the Splinters are all removed. If the Fracture is occasioned by an internal Disorder, such as a Caries of the Bone, you will find it much more difficult to cure, than when it proceeds from any external Violence: Nay, it is frequently an incurable Case, unless the Occasion of it, to wit, a scorbutic or dropical Habit of Body, or a venereal Taint, be removed.

XVI. When a large Piece of Bone is driven away by a Pistol or Musquet Ball, it is better to cut off the lower Part of the Limb, since the two Ends of the Bone are never likely to unite, than to deceive the Patient with the fruitless Hopes of a Cure, and weaken him to the last Degree, with the Attempt. But when only a small Piece of the Bone is carried off in this Manner, you may safely enough attempt the Union of the Parts, but the Limb will be ever shorter than the other; and if the Injury is in the Foot, he will be always lame.

XVII. When the Blood insinuates itself through a Fissure into the internal Part of the Bone, by corrupting there, it produces a Caries, or Spina Ventosa, incurable Fistula, Tabes, and Sphacelus, which always require Amputation of the Limb, and frequently destroy the Patient. The same Accidents will happen in Fractures of any Kind, when the extravasated Blood mixed with the Medulla, and corrupts it.

XVIII. Fractures of the lower Limbs are much more inconvenient than those of the Arm: Though Disorders of the upper Limbs are easier concealed,

^a HORSTIUS, in *Observ. Med. P. II. Lib. IV. Obs. 10.* gives us an Account of a Man who suffered a Loss of Substance in the Bone of his Foot, of the Size of three Fingers Breadth. But he cured his Patient without leaving any Lameness. If the Story is true, it is very extraordinary.

whereas

whereas those of the lower Limbs appear presently, especially in Men, from the Lameness and Deformity which they occasion, which require great Care in the Treatment of them. On the other hand, the Deformity is more conspicuous in the Arms of Women: In these Fractures, therefore, more Care is required, and a nicer Operation, that the Callus may be formed as smooth as possible. But where there is a Fracture of the Bones from Gun-shot Wounds, especially on the Joints, as the Tarsus, the Knee, Elbow, Shoulder, or Thigh, it is attended with great Danger, and often with Death, if not prevented by immediate Amputation.

Cure of FRACTURES.

XIX. The Surgeon's principal Care in Fractures is to unite the broken Bone, ^{Cure,} to which three Things are necessary. 1. That the Bone be restored to its natural Situation, which is to be done by extending it and replacing it. 2. That after the Bone has recovered its natural Situation, it be kept there by giving it Rest, and applying proper Bandages. Lastly, 3. You are to use proper Means to prevent, or remedy, the Disorders that usually attend this Accident. The Knowledge of Anatomy is necessary to perform these Intentions: For, 1. The Surgeon must be acquainted with the Situation and Structure of the Bones, that he may know whether the injured Limb is supported by one or more Bones, whether they are large or small, whether they are firm or spongy, whether they are even or uneven, whether one or more Bones are broken at the same Time. 2. What Muscles there are in the Neighbourhood of the Bone, their Situation and Office. Lastly, Whether any considerable Nerves or Blood-vessels are near the fractured Part: All which Things are absolutely necessary to be known by any one, who expects to succeed in the Cure of these Disorders.

XX. When the fractured Bones maintain their natural Situation, you are un- ^{Of Extension.} der no Necessity of extending or replacing the Limb, but of applying a proper Bandage. But when the fractured Parts recede from each other, some Degree of Extension is necessary, which must be always suited to the Distortion of the Limb. The greater Distance there is between the Extremities of the divided Parts of the Bone, so much shorter will the Limb be, from the Contraction of the Muscles; therefore the Extension in this Case ought to be in Proportion so much the greater: But to prevent the Patient from suffering any Violence, every Thing ought to be done tenderly, and with great Care.

XXI. The Extension of fractured Limbs ought to be performed in the following Manner. 1. The Patient is to be kept firm and steady: The Posture of Body, to be observed at this Time, differs according to the Circumstances of the Case: Sometimes the Patient should sit, either upon a Stool, or upon the Floor; sometimes it will be better for him to lie upon a Table or a Bed. 2. An Assistant should support the Limb with his Hands, both above and below the fractured Part. 3. The Assistant who holds the lower Parts of the Limb should extend it strongly, till you can replace the fractured Part of the Bone: If his Hands alone are not sufficient to make the required Extension, he must use a Cord, or rather a Napkin: If one Man has not Strength enough for this Office, you must employ two, or more. You must be very careful not to

How the
Extension is
to be made.

use too great Roughness in this Operation, lest you should give your Patient unnecessary Pain.

Means used
by the An-
cients for
Extension.

XXII. The Surgeons amongst the Antients, when they found that neither Hands nor Napkins were sufficient to make a proper Extension, (which was indeed a very rare Case) contrived several mechanical Instruments to answer this End. For this Purpose you will see several Pullies with Ropes described; the *Scammum Hippocratis*, and several Machines of this Kind, which you will find in the Works of the principal Surgeons, such as ORIBASIUS, PARÆUS, ANDREAS A CRUCE, SCULTETUS, and others. But if we attend to the Observations of several modern Surgeons, which are made with great Accuracy, we shall find that Machines of this Kind do not act sufficiently equal in all Parts at the same Time, and that you will find great Difficulty in applying them: Besides, they are not always at hand in Times of War, and upon many other Occasions. Therefore it is no Wonder that you scarce ever see or hear of these Instruments amongst the Surgeons of the present Times; especially since you will always find your Hands or the Napkin sufficient for any Extension that can be required.

What is to
be done
where you
have Tumor
and Inflam-
mation.

XXIII. There remains one Observation to be made with relation to the Extension of the Limb. When the Surgeon is called at some Distance of Time from the Accident, when a Tumor and Inflammation are come on, it is best to defer the Extension of the Parts till these Symptoms are removed. For it is impossible to make a proper Extension whilst the Parts are affected in this Manner, without bringing on the most acute Pains, Convulsions, and Danger of Sphacelus. But if the Symptoms of this Kind appear but in a small Degree, it is better to attempt the Extension of the Parts instantly, before the Inflammation encreases.

How the In-
flammation
is to be
treated.

XXIV. Where the Inflammation is already arrived at so great a Height as to forbid the Extension of the Parts, the Surgeon's principal Care should be directed to assuage this Symptom. The same Methods which we proposed for dispersing Contusions, (*Chap. XV, B. I, N. X, &c.*) Blood-letting, loosening the Bowels, advising the Patient to drink large Quantities of aqueous Fluids, prescribing such internal Medicines as are known to abate Inflammations, and fomenting the Parts with warm dispersing Fomentations, will answer this Intention. These Applications will usually remove the Inflammation in four and twenty Hours, in such a Manner that you may safely undertake the Extension of the Limb. Instead of the foregoing Fomentations you may use the following, which very powerfully answers the Intention it is prescribed for. *R. Herb. Scordii Mij, vel iij. Aq. simplicis ℥ j. Spiritus Vini ℥ vij. quæ simul per Horæ quadrantem probè decoct. admixtisque Salis Culinaris ℥ j. it. Nitri ℥ ss identidem cum Linimentis calidè supra fractum membrum deligentur.* Where the Inflammation is so violent, that it will not yield sufficiently in the Time abovementioned, to admit of the Extension of the Limb, and the Patient is plethoric, you must open a Vein, and repeat these Applications till they take Place, and the Symptoms disappear.

Of Splinters.

XXV. Sometimes you will be troubled with Splinters of the Bone in your Way, which vellicate and prick the neighbouring Part, and will render the Reduction of the Bone very difficult. If the Splinters are free, and have no Connection to the Bone, you must remove them carefully: If they hang by a Por-
tion

tion of the Periosteum, divide them with your Scissors, for you will never find that they will easily unite again with the rest of the Bone, but will always give you great Uneasiness and Trouble in your Cure. If the Splinters adhere to the neighbouring Parts, and do not much impede the Reduction of the Bone, it will be best to replace the Bone, and to leave the Splinters either to loosen and come away by the Suppuration of the Parts, when they may be taken out without giving the Patient great Pain; or sometimes they will grow again to the rest of the Bone. When they adhere very firmly to the principal Parts of the Bone, we should be so far from attempting to extract them by Force, that we should endeavour to replace them with the greatest Exactness. When this is performed with Accuracy, they will frequently unite to the rest of the Bones. But where that is not to be expected, we must get them out by Degrees in the best Manner we can.

XXVI. Where Points of the broken Bones or Splinters stick so far out, that they are an Hindrance to the Reduction of the Bone, you should diligently consider whether you can by any Means contrive their Reunion to the Bone; which you may judge of, by observing at what Distance they are removed from some large Bone, and whether there is a large Quantity of Flesh intervening. Where they cannot be reduced or reunited to the Bone, they may be removed by a pair of strong pointed Forceps, *See Plate VIII, Fig. 1.* or if they stick very firm you may use a fine Saw, *Plate VII, Fig. 9.* When you have removed the Splinters, you are in the next Place to make your Extension, and reduce the Bone; till they are removed, the Reduction and Reunion of the Bone are generally impracticable.

Of Splinters sticking through the Flesh.

XXVII. If the Splinters are concealed under the Skin, and you cannot lay hold on them with your Hands, you must first try if you can reduce them to their natural Situation. If this cannot be done, make an Incision through the Skin, and take them out.

Of Splinters that are concealed under the Skin.

XXVIII. To make a proper Extension of the Limb, two Assistants should be employed, in the Manner we described above at N. XXI. and the Surgeon should take hold of the extended Part, and direct it with his Hands, sometimes a little outwards, sometimes a little inwards; now upwards, then downwards; putting it into different Positions, as the Circumstances of the Case shall require, till the Parts have recovered their natural Situation.

Of Extension.

XXIX. You may know that the Bones have regained their natural Situation, by the Remission or Absence of Pain, and by observing that the fractured Limb is of the same Figure and Length with the sound Limb. If these Signs of Recovery are wanting, you have good Reason to suppose that the Operation is as yet ineffectual, and the Extension is to be repeated or continued in the Manner we have described, till the Bone is replaced.

How to discover when the broken Bones are replaced.

XXX. The Bones being properly replaced; the next Thing to be done is to secure them in their Situation, that they may unite to the best Advantage.

They are to be kept in that Situation.

XXXI. Two Things are chiefly required to answer this End. 1. To bind it up properly: And, 2. To lay the Limb in a convenient Posture. The Apparatus for securing the Situation of the Limb is composed of *Bandages, Bolsters, and Splints* ^a,

How Fractures are to be bound up.

^a The famous PETIT of Paris forbids the Use of *Splints*, and supplies their Place with *Bolsters*, which I think will by no Means answer.

which are to be made of thick Paper, of Wood, or, if the Surgeon shall think proper, of thin Plates of Copper, Brass, Steel, Tin, or Lead. See Plate VIII, Fig. 7. But I think the best are those made of Wood or Paper. The Manner of Dressing the Limb is as follows: In the first Place a Roller is to be passed round the fractured Limb; upon this are to be placed Bolsters, and over them Splints, which are to be secured by a tight Bandage over all. In some Cases other Instruments are necessary, such as Boxes made of PASTE-board, Wood, or Metal, to fix the fractured Limb in. See Plate IX, Fig. 9. Other Instruments are also necessary in this Case: The particular Manner of applying which, to the Arms, Legs, and other Parts, we shall describe below, when we treat particularly of Fractures; and there you will find that simple and compound Fractures require different Bandages. This Apparatus of Instruments is required only to secure the Bones in their Situation, and to forward their Union. It is no Wonder therefore that Fractures are ill cured, where the Surgeon is ignorant of the proper Methods of applying the Bandage, or the Patient is unruly, and will not give the Limb proper Rest.

The Use of
Plasters in
this Case.

XXXII. Although great Numbers of Surgeons at this Time make it their constant Practice to apply a Plaster to the fractured Part of the Limb before they make the Bandage, yet the most prudent and skilful Surgeons amongst the Moderns entirely reject Applications of this kind, as not only useless, but injurious to the Patient. For these Plasters can do no Service without the Bandage; but the Bandage alone, if it is dextrously made, is sufficient to keep the Limb firm: And the Plaster carries this Inconvenience with it, that it stops up the Pores of the Skin, and produces Tumors, and most violent Itchings. For my own Part, I am entirely of Opinion, that all Kinds of Fractures may be very happily cured without the Use of Plasters, and I am confirmed in this Opinion by long Experience. But if, notwithstanding this, any one should be bigoted to the Use of Plasters, I would advise him to be cautious not to make them of too great Length: They should not entirely surround the Limb; but a Thumb's Breadth of it at least should be left bare, lest the Blood should be obstructed in its Course, which would bring on Tumors, Gangrene, and Spachelus.

Of the Dressings.

XXXIII. Before we treat more particularly of Fractures, it will be proper to say something briefly of the Apparatus of Dressings required in Cases of this Kind: And since the chief Help seems to be expected from Bandages, we should principally contrive that besides having the general Properties of a due Length and Breadth, they should also be accurately adapted to the Shape of the broken Limb. In Fractures that are not attended with a Wound, you should apply two single-headed Bandages, each of which should take its Beginning upon the injured Part; one ascending, when it has gone thrice round the Limb, and the other descending in a contrary Direction, and then ascending again. The same Windings and Circumvolutions may be made with a single Bandage, if it be long enough; as will appear from our Treatise of Bandages.

The Bandage should be neither too tight nor too loose.

XXXIV. In order to keep the Parts in their natural Situation, the Bandage should be made pretty firm: But if you tighten it too much, you will interrupt the Circulation of the Blood, and excite Tumors, Inflammation, and Gangrene: On the other hand, if the Bandage is made too loose, it will easily come off, and set the disunited Parts at Liberty: The middle Way therefore is most eligible. You will discover the Mean between these two Extremities by observing

a slight

a slight Degree of Tumor below the Bandage, after it has been applied for some Time. If the Tumor encreases to a violent Degree, you must loosen the Bandage: If the Parts do not enlarge at all, you must bind it still tighter.

XXXV. *Bolsters* and *Splints* are to be prepared in proportion to the Size of the fractured Limb: Where the Limb is of an unequal Size in different Parts of it, you must fold up the Bolsters in the Manner we have described at *Plate IX, Fig. 13.* You will by this Means be able to apply the Splints to greater Advantage. The Splints should be tied on with three Tapes, the Middle of which is to be fastened first, and then the others.

Of Bolsters
and Splints.

XXXVI. In Fractures of the lower Arm, after you have applied your Dressings and Bandage, you may suspend it in a *Scarf* or *Sling* (by the French called *Escarpe*) which is to hang from the Neck. See *Plate XXXVIII, Fig. 17.* In Fractures of the Leg you may rest the Limb upon Pillows, *Plate IX, Fig. 5.* or in Boxes, *Plate IX, Fig. 9.* placing Cushions or Pillows under it. These Machines also are to be fastened to the Limb with Tapes, that it may remain fixed and immoveable. Some Surgeons fasten a Pillow under the Limb, after the Application of the Bandage, in Imitation of SOLINGIUS. See the Amsterdam Edition, printed in 1698, *Plate XV, Fig. 9.* Others use wooden Boxes, such as you will find described by SOLINGIUS and SCULTETUS. But the most prudent Surgeons prefer Cushions or Pillows: For this is not only more useful than any other Method, but it is also very handy and easy to come at. We use in this Place a sort of a *Sole*, *Fig. 6.* made of thick Paper or Wood, which keeps the Foot steady. This should be lined with a soft Bolster, to keep it from galling or fretting the Foot. See *Fig. 7.* It is to be fastened to the Pillows by the Tapes *a a a, Fig. 6.* A Piece of Linen, in the Shape of a Ring, is to be sewed to the lower Part of this Bolster, and fastened on with the Strings, *b b, Fig. 8.* This is a Contrivance to suspend the Heel, to prevent Inflammation, Pain, and other Mischiefs that are frequently brought on by lying upon it too long. The two-headed Bandage has its Use in this Case; for the Heel may be put into this, and the two Heads of it being sewed to it, will be kept fast on. The two Heads of the Bandage are to be placed one under the internal, and the other under the external *Malleolus*, to prevent too great Stricture upon the *Tendo Achillis*, which would bring on acute Pains and Inflammations. You may make an Arch over the Foot with a Piece of Hoop, which will keep the Bed-cloaths from being troublesome, and at the same Time not prevent the Application of warm Napkins, or Fomentations to the Part. See *Plate IX, Fig. 10.*

How the
fractured
Limb is to
be placed.

XXXVII. The Patient should lie upon his Back, with his Head and the fractured Limb somewhat higher than the rest of his Body: He should have a Rope with a Handle at the End of it hung from his Bed's Tester, that he may be able to take hold of it, and raise himself up when there is Occasion. If he is of a plethoric Habit of Body, you will do well to bleed him in the Arm, to prevent Inflammation. The Surgeon should be very frequent in his Visits at the Beginning of this Disorder, and very diligent in examining whether the Bandage, and other Applications, remain sufficiently firm or not. If any thing is out of Order, he is to correct it, the Regimen with regard to Diet should be the same which we advised above, when we treated of Wounds. See *Chap. I. § XLIII. and the following.* He must not attempt to rise on any Account, but be supplied with Bed-pans, &c.

How the
Patient is to
be treated.

XXXVIII. The

When the Dressings are to be opened.

XXXVIII. The first Dressings should be opened and renewed sooner or later, in proportion to the Nature and Number of the Symptoms that accompany the Fracture. When the Bandage remains sufficiently tight, and no bad Symptom appears, you should not loosen it, till the fifth or eighth Day. But where you have Inflammations, Tumors, Pains, and violent Itchings; or where the Bandage is too loose or too tight, which is frequently the Case, you must instantly take off the Dressings, and change them. The second and third Dressings must be performed in the same Manner with the first; with this only Difference, That at the third Dressing, if you perceive no Tumor, you may make the Bandage tighter than before, and by this Means prevent the luxurious Growth of the Callus, which would occasion Deformity.

Cure of Fissures.

XXXIX. When you have Reason to judge, by the Symptoms related above at N. III, and V, that your Case is a *Fissure*, you may follow FELIX WURTZIUS's Instructions upon the Head. He always laid his ^a Plaster, which he made use of in Fractures, upon the disordered Part, and upon that he placed Splints, and advised the Patient to rest for some Days, and the Tumor will quickly disappear. When you find the Tumor advanced in Size, and soft, it is a plain Indication that it contains a Fluid, which is to be let out by Incision. When you have evacuated the corrupted Fluids, you should put a Tent into the Wound, dipt in the *Ungentum Fuscum Wurtzii*, using afterwards the Bandage which is applied to Fractures accompanied with a Wound. If we listen to WURTZIUS, Ointments, Cataplasms, Fomentations, and Baths, are of no Service in this Case, but are prejudicial. For collected Fluids putrifying, corrupt the neighbouring Parts, and the Bones, and bring on Caries, and other grievous Disorders. The Symptoms that arise from Fissures are frequently attributed to Defluxions, or to the Gout. Whoever desires to be more fully informed of the Nature of this Case, I would advise him to consult WURTZIUS, *Part II. Cap. xxviii. pag. 381. edit. Basil. ann. 1687.* GOUETIUS asserts, that Fissures, when they are just made, may be cured by the Application of Bandages without the Assistance of other Remedies. See *Veritable Chirurgie*, pag. 86.

CHAP. II.

Of DISORDERS accompanying FRACTURES.

Of a Fracture accompanied with a Wound.

I. IF a Fracture is accompanied with a Wound, after you have reduced the fractured Bones, you must treat the Wound in the same Manner with other lacerated Wounds. First, the Wound is to be well cleansed with warm Wine, Spirits of Wine, or salt Water; in the next Place, it is to be filled with dry Lint, to stop the Hæmorrhage; then to be dressed with digestive Ointment^b; lastly,

^a The Plaster is made in the following Manner: R. Resinæ pur. ℥s candida ℥iij. Terebinthin. Vulg. ℥ss. leni igne liquefiant, injectoque demum Radic. Ulmaria Pulv. 3 iv. tantisper bene subigantur, donec modicè frigeant. When you have a mind to spread it upon Linen or Leather, throw it into hot Water. The Author is very high in his Commendation of this Plaster at pag. 320. of his Surgery.

^b If any Hæmorrhage should happen, you must observe the Methods we described when we were treating of Wounds.

it is to be anointed with some vulnerary Balsam till it is thoroughly healed. Since it is necessary to open the Dressings every Day, in order to cleanse the Wound, but at the same Time it would be of very bad Consequence to move the Limb, therefore a great Length of Bandage in this Case would be very wrong, especially in the *Femur* or *Tibia*: For it would be troublesome to lift the Foot up to roll on a long Bandage, which would disturb the fractured Bones, and throw them out of their natural Situation. For this Reason the best Surgeons neglect the Use of long Bandages in this Case, and apply the Bandage of eighteen Heads, *Plate IX, Fig. 4.* which may be loosened at Pleasure. When the Wound is healed, which happens frequently before the Bones are united, you should lay aside the Bandage of eighteen Heads, and bind up the Limb with long narrow Rollers till the Cure is thoroughly perfected. But we shall explain this more largely below, when we come to treat professedly of Bandages.

II. When a Fracture is attended with an Ulcer without a Caries; which frequently happens in the Leg or Thigh; it is to be dressed every Day, after the same Manner as we directed for a Wound in the same Circumstances: Having first replaced the Bone, the Limb is to be bound up with the Bandage of eighteen Heads, till the Ulcer is healed. But when the Ulcer is healed, and the fractured Parts of the Bone not sufficiently united, you must lay aside the Use of the eighteen-headed Bandage, and apply long narrow Rollers, as we advised above for a Fracture attended with a Wound.

A Fracture
attended
with an Ul-
cer;

III. Sometimes the Fracture happens upon a Part that has been long troubled with an Ulcer and Caries; this Case is very difficult of Cure, nay frequently it admits of no Cure at all. Very few Writers in Surgery have laid down any Directions, by which we may be guided in this Case. PETIT indeed describes the Case of a *fractured Tibia attended with a Caries*: But as he has related the Case of the Tibia alone, neglecting to describe it as happening to other Parts, he has in my Opinion, by no means satisfied the Subject. However, this may serve as an Example to be imitated in similar Cases, till we shall be furnished with more perfect ones. A young Man, who had been for some time troubled with an Ulcer and Caries, about the Middle of the Tibia, had the Misfortune to break the Bone in the very Part, the Fibula remaining at the same time whole; therefore no Extension was required in the Cure of this Fracture. PETIT, in the first place, took off all the vitiated Flesh that was situated near the fractured Part, with his Knife, and reduced the Ends of the Bone into their proper Situation with his Fingers, and then filled up the Ulcer with dry Lint, and covered all with the eighteen-headed Bandage, as above. After some Days, when the Fever was quieted, he cauterised the Extremities of the fractured Bone that were affected with Caries, and afterwards took off the carious Parts with the Trepan, which the French call *Trepan exfoliatif*: Having done this, he applied Lint to the naked Bone, well saturated *cum Tinctura Aloës*. But he dressed the fleshy Parts first *cum Unguento digestivo*, and afterwards *cum Unguento fusco*, to keep down the Luxuriancy of the hard Flesh, which is very prejudicial in this Case: And this Method of dressing he continued for fifty Days, till the disordered Parts of the Bone separated from the sound. He then began to encourage the Growth of new Flesh, by applying vulnerary Balsams, and healed both the Bone and Ulcer after the usual Method.

IV. But

A fractured
Thigh with
a Caries.

IV. But the Case is attended with far greater Difficulties when the Fracture happens upon an ulcerated Part, attended with ^a Caries in the Thigh; which Case I find entirely neglected in PETIT'S Book of Fractures. I knew a Student of about twenty Years of Age, who had been troubled for many Years with an Ulcer and Caries, in the Middle and internal Part of his Thigh, near the Situation of the crural Artery. The Flesh in this Part was so thick, that the Caries did not appear, and the Vicinity of the great Artery prevented us from enlarging the Ulcer with the Knife, or from cauterising the Bone, so that all the Medicines which were applied had no Effect: At length, as he was walking about, the Thigh broke in this disordered Part, without the Assistance of any external Force. What should we do now? we were prevented from enlarging the Wound, or cauterising the Bone, by the Reasons I just mentioned: And though we replaced the Bone, and applied a proper Bandage, yet it would never unite, but the Patient dragged on a miserable Life. Therefore it is worth our serious Consideration, what is the best Method of Cure for Fractures of this Kind when they happen in the Thigh, Arm, or other Parts where the Bones lie concealed and cannot be laid bare with Safety. But this is rather to be wished for than expected.

Of the Cal-
lus.

V. The Surgeon has done his Duty in the Treatment of a Fracture, when he has diligently replaced the Bones, and taken Care to preserve them in that Situation. For Nature has provided for the rest, by supplying the divided Parts with a Callus; a Sort of Gelly or liquid viscous Matter, that sweats out from the small Arteries and bony Fibres of the divided Parts, and fills up the Chinks or Cavities between them: This first appears glewy, then of a cartilaginous Substance, but at length becomes quite bony, and joins the fractured Parts so firmly together, that the Limb will often make greater Resistance to any external Violence with this Part, than with those which were never broken, in the same Manner as we frequently see it happens to Pieces of Wood well glewed.

Its Growth.

VI. But as the new Flesh in Wounds will frequently sprout up too fast, so will the Callus in Fractures, and by this Means render the Limb uneven and deformed, especially in Fractures attended with a Wound. Where this is the Case, and you see plainly that you cannot prevent it, you had best inform your Patient of it in Time, lest he should blame his Surgeon as the Author of his Deformity. For it cannot always be prevented or remedied; nor can you take off the Luxuriancy of a Callus as you can of the Flesh, for several Reasons of Consequence: Therefore when once it is formed it remains without Cure.

How to pre-
vent the Lu-
xuriancy of
the Callus.

VII. But some Measures may be taken to prevent the Callus from exceeding its due Bounds, by making the Bandage somewhat tighter than ordinary, and wetting it first with the best rectified Spirits of Wine. This will not only keep the viscous Matter within its Bounds, but will also forward its Induration. Which may be observed in the Tibiæ of Men and the Arms of Women, as those Parts are more frequently exposed to View. But in Fractures attended with a Wound, as they will not admit of too tight a Stricture; especially if you use the eighteen-headed Bandage, it is extreme difficult to prevent a Luxuriancy of Callus. When once the Callus is indurated, we have no Medicine that will take it down or destroy it. Nevertheless, there are some who pretend that it is

^a Lib. De Morb. Off. Tom. II. p. 270, &c.

to be dispersed by the *Emplastrum de ranis Vigon. cum Mercurio*, tying a Plate of Lead over it. The Callus grows sometimes faster, sometimes slower, according to the Size of the fractured Bone, the Habit of the Patient's Body, the Temperament of the Air; and lastly, in Proportion to the Patient's Age. When it comes on but slowly, some Surgeons place great Confidence in the Patient's taking *Osteocolla*, half a Drachm at a Dose.

VIII. Violent Itching is best prevented by removing oily fat Remedies, and therefore the Plasters themselves, from the Limb: For they are composed of such Particles that they stop up the insensible Pores of the Skin. If the Itching remains after the Removal of these Applications, you may wash the Part with warm Wine, Oxycrate, or Spirit of Wine, covering it up with soft, fine Linnen. If Blisters rise upon the Part, they should be snipt with the Scissors.

To prevent violent Itching.

IX. Inflammations are to be treated in the Manner we advised above in *Book I. Chap. XV.* But to remove Pains and Convulsions, you should diligently attend to what we laid down in describing the Cure of Wounds: But above all, you should be very accurate in replacing the fractured Bones, and in observing whether they maintain the Situation which you restored them to; and if you observe any Splinters quite free from the neighbouring Parts, you should instantly remove them, and endeavour to lay the Limb in an easy Posture. In these Circumstances you should not neglect to open a Vein, and to apply emollient and dispersing Cataplasms and Fomentations, prescribing at the same time Medicines to be given internally with this Intention, and advising the Patient to observe a proper Regimen with regard to his Diet. Without observing these Rules, violent Inflammations, Sphacelus, and Death itself will frequently ensue.

Of Inflammation, Pain, and Convulsion.

X. If the Inflammation is so violent as to threaten a *Gangrene* of the Part, you must bleed instantly, lay aside the long narrow Bandages, and apply the Bandage of eighteen Heads, use Fomentations prepared *ex Aquâ Calcis & Spiritu Vini Camphorato cum Essentiâ Aloes & Myrrhæ; vel ex Spiritu Vini Camphorato & Sale Ammoniaco*, or the Remedies we recommended above, treating of Fractures, *C. I. N. XXIV.* and in the Chapter on *Contusions*. But if the Part is already affected with *Gangrene*, you must make frequent and deep Scarifications, to set the stagnating Fluids at Liberty, not neglecting at the same time to apply externally the Fomentations we recommended above, and to give the Bark inwardly. When the *Gangrene* has penetrated so deep into the Parts, that it is beyond the Reach of Fomentations, and begins to be sphacelated, you must take off the Limb, to save the Life of the Patient.

How a Gangrene is to be treated.

XI. If the Fracture is attended with a considerable Discharge of Blood, you should diligently examine whether the Hæmorrhage proceeds from a Vein or an Artery. Whether the Flux of Blood is to be stopped by Pressure, by the Help of dry Lint, Bolsters, and Bandages; or by styptic Medicines, or by making a Ligature upon the injured Vessels; or lastly, by the actual Cautery, as we have taught above *Chap. II. on the Cure of Wounds*. After the Blood is stopped, the Bones are to be replaced, extraneous Bodies are to be removed, and the Limb bound up.

Of Hæmorrhage.

XII. If a Relaxation of the Nerves, or Wasting of the Limb, succeed a Fracture, there are very little Hopes of help. However it will be adviseable, (1) To rub the Limb well with hot Cloths; (2) With spirituous Medicines, such as

Of Palsy and Wasting of the Limb.

Spirit. Formicar. Lubricor. Matricalis, C. C. Sal Ammoniac, Essentia Euphorbii, Castor, and others. (3) To foment the Limb with warm Fomentations and Baths made *ex Vino Herbisque corroborantibus, Aromaticis ac Nervinis, vel Thermis naturalibus.* (4) Lastly, the best Remedy, in my Opinion, is, to wrap the tabid Limb up in the Skin of an Animal that is just killed, and remains in its natural Heat: For by this Means the Flux of the Blood and nervous Juices to the Part, is very much excited: And more particularly so when you prescribe at the same time nervous and strengthening Medicines to be given internally.

Stiffness of
the Joint.

XIII. When the Joint is become rigid and inflexible, which Disorder the *Greeks* call an *Anchylosis*, if it is occasioned by a Discharge of the Juices of the broken Bone into the Joint, which concretes there instead of forming a Callus in the fractured Part, this Case will turn out very difficult to cure. But if this Disorder is occasioned by having kept the Joint for a long Time without Action, or from a Concretion of the Juices that are secreted in these Parts to make them slippery and easy to move; it will be very proper to foment the rigid Part with emollient Fomentations and Baths; to rub it frequently with Oils and Fat of Animals, or with emollient Ointments; and to move it backwards and forwards frequently with your Hands, till it shall recover its natural Faculty of moving^a.

Fracture
with Dislo-
cation.

XIV. You have frequently a Dislocation as well as Fracture of the Bone, in one and the same Limb. When this is the Case, the Luxation must be remedied in the first Place; and then the fractured Parts may be restored to their natural Situation: Each of them must be dressed with a proper Bandage. Sometimes the Fracture happens so near the Head or Articulation of the Bone, that it is impossible to fix your Hands or Instruments to make a proper Extension. In this Case, the Fracture is first to be attended to; which must be cured, before you can attempt to remedy the Luxation: Though you should be very careful, during the Cure of the Fracture, to foment the luxated Limb *cum Spiritu Vini, vel solo, vel camphorato, vel & aceto calefacto.* This Method may keep the Part free from Inflammation and Tumor. I will not pretend to affirm, that this Method of Cure is always to be depended upon: For it frequently happens that the luxated Parts are to be reduced by no Art. But as this is the only probable Method of relieving the Patient, and as there are frequent Instances of its being attended with Success, even where the Luxation has been of some Months, or even a Year's standing, I think it ought by no Means to be rejected^b.

In what
Manner
Limbs are to
be broken
again, when
they have
been ill set.

XV. If a fractured Limb appears crooked and deformed after the Cure has been performed, which Accident happens either from the Negligence of the Surgeon, or from the imprudent and restless Behaviour of the Patient; I know of no other probable Method of restoring the Limb to its former Shape and Beauty, than by making a strong Extension of it, and breaking it in the Part where it is just united: By this Means the Parts may be replaced in a more proper Manner. Great Care and Circumspection is required in the Treatment of the second Fracture. When the Deformity complained of is but small, and the Callus intirely indurated, or where the Patient is in Years and infirm, I should not advise this Method of Cure to be attempted; since it is not only attended with great Pain, but with great Danger also. On the other hand, when the Callus is tender, and the Patient young and vigorous, I think this Operation

^a For the Cure of an *Anchylosis* see LE DRAN, *Obs.* 93, 94. and BOERHAAVE's *Aph. Pract.* N. 556.
^b See PETIT, on *Diseases of the Bones.*

may be fairly attempted. In the mean Time, it is necessary to observe here, that before you undertake this Cure, you must endeavour to soften the Callus, by using emollient Baths, Fomentations, and Ointments, for several Days.

C H A P. III.

Of FRACTURES in particular.

I. SINCE we have already treated of Fractures of the Bones in general, it remains now that we speak to particular Fractures. And first, in this Chapter, we shall treat of those that happen in the Head. We spoke largely enough above in *Chap. XIV.* of Fractures of the Cranium: Therefore we shall now proceed to describe other Kinds of Fractures.

The Connection and Argument of this Chapter.

FRACTURE of the NOSE.

II. In the Nose, both Bone and Cartilage are the Subjects of Fracture, which happen sometimes on either Side; sometimes in the Middle, chiefly by a Blow or Fall: This is easily to be distinguished by the Sight or Touch. If either of the Bones in the Front of the Nose are fractured, it produces a Flatness in the Nose, and the Air meets with Obstructions in its Passages through the Nostrils. If the Bone on either Side is fractured, the Part becomes hollow: When the Cartilage is disturbed, the Nose inclines too much to one Side. See CELSUS upon this Head, *Lib. VIII, Cap. 5.* Sometimes the Fracture happens without a Wound, but is much oftner attended with a Wound of the common Integument. See SAVIARD, *Obs. 107.* If the Injury of the Nose is very violent, the Fracture cannot be so perfectly cured, but some Deformity will still remain. The Vicinity of this Part to the Brain, which is frequently injured at the same Time, renders Cases of this Kind frequently very dangerous. A Caries also, Ozæna, and Polypus, are no uncommon Attendants upon this Disorder: By which Means the Sense of Smelling, the Faculty of Speech, and the Actions of Inspiration and Expiration, are very much disturbed.

Fracture of the Nose,

III. In order to restore the fractured Bones of the Nose to their natural Situation, the Patient is to be placed in a Seat opposite to the Light, and his Head held back by an Assistant. The Surgeon is to raise the depressed Parts with a Spatula, Probe, or a Quill, applying externally the Thumb of one Hand, and the Fore-Finger of the other. If the Bones of the Nose are fractured on both Sides, they are to be raised on each Side after this Manner, and the Cavity of the Nostrils is to be filled up with long Dossils to prevent the Bones from collapsing; covering the Part also, for this End, with some Plaster, having first applied such Dressings as are ordinarily used to recent Wounds. If the Bone is fractured into several Splinters, they are to be forced into their proper Places by the Fingers; but if a Splinter is so entirely separated from the Bone, that it will not easily unite with it again, you must remove it with your Forceps.

After what Manner Bones of the Nose are to be replaced.

IV. When the Fracture of this Part is accompanied with an external Wound, after you have replaced the Bones, you should dress the Wound (at first) with dry Lint, covering it with a vulnerary Plaster: Afterwards you must use balsamic Medicines; such as *Ung. Digestiv. Essent. Aloes, Myrrhæ, Succin. Mastich.* All greasy and oily Medicines are to be diligently avoided here, and in all

How a Fracture with a Wound should be treated, and Bandage be performed.

other Cases where the Bone is injured ; because they are very hurtful in these Cases. But where you have no external Wound, it will be sufficient to apply a sticking Plaster to the Part, to secure the Bones in their Situation : And by this Means you will find they will unite in about fourteen Days ; if no Abscess or Caries supervene. If the Bone should require a stronger Support than what we have hitherto mentioned, you may make one of single or double Cap-Paper, which may be adapted to each Side of the Nose, and supported with Bolsters. See Plate VIII, Fig. 8. The whole must be supported with a Bandage of four Heads, which must not be bound on too tight ; which will appear to you more clearly, when you consult what we shall say below, where we are to treat professedly of Bandages. Before the Plasters and Bandages are applied, some introduce a Silver or Leaden Pipe, or Quill, into each Nostril, to render the Faculty of Breathing easier. See Plate II, Lett. P and Q. In order to secure these Pipes and the Bones of the Nose in their proper Situation, they use the four-headed Bandage. Some amongst the modern Surgeons intirely reject the Use of all this Apparatus, except the Bolsters, Bandage, and Plaster ; for they are of Opinion that it does more Harm than Good, and that the Introduction of Pipes, or even Tents, into the Nostrils, will occasion so great a Degree of Irritation, and such a Difficulty of Breathing, as is not to be borne : Besides, when once the Bones of the Part are properly replaced, they are not so easily disturbed as is commonly imagined. In these and all other Cases, where there is no Necessity for a more laborious and complicated Treatment, the simplest and easiest Method of Cure is always to be preferred.

C H A P. IV.

Of a FRACTURE of the JAW.

Of a Frac-
ture of the
Jaw.

I. **T**H O' both Jaws are liable to Fractures, the upper is less so than the lower ; and even that, than the rest of the Bones. When they happen in the upper Jaw, the divided Parts must be replaced, as near as possible ; and then covered with a Plaster, as in the Nose. When in the lower Jaw, it is broke either on one Side or on both ; and the divided Parts in this Case do not recede any considerable Distance from each other ; for the Muscles of this Part are so situated, that the Bones are not much separated from each other by their Action. But the Degree of Injury depends upon the Violence of the Blow received.

By what
Signs a Frac-
ture of the
Jaw is
known.

II. That Kind of Fracture in this Part is soonest discovered, where the Bones are separated from each other. For not only your Eye, and often your Ear, but especially the Touch, will speedily and evidently demonstrate what is displaced in the Jaw ; and whether the natural Position of the Teeth be disturbed. Besides which, the Patient's suffering violent Pains, and sometimes Convulsions, is usually a pretty certain Sign that the Jaw is fractured : But if the Pieces of the Bone are not separated, the Fracture is discovered with much more Difficulty.

How the
Bones of the
Jaw are to
be set or re-
placed.

III. A Fracture of the Jaw being thus discovered, our next Intention is to restore the broken Bones to their proper and natural Position. The Patient is therefore to be commodiously seated against the Light, and his Head to be held firm

firm by an Assistant. The Surgeon is then to introduce his Thumb or Fore-Finger of one Hand into his Mouth, applying his other Hand externally : And by this Means he is to press the Fragments of the Jaw on each Side, till they have regained their former Situation ; which may be known by the regular Disposition of the Teeth. But if any of the Teeth be found loose or slipped out, it may not be improper, if nothing hinders, to restore them afterwards to their Places*, and to fasten them by Gold or Silver Wire, or with Cerate, to such as are next them : For by this Means they have been frequently held firm. If the Jaw should happen to be broke on both Sides, they must be restored one after the other by the same Method as before. But then the Operation is usually more or less successful in proportion to the Surgeon's Skill in the Anatomy of this Part. If there should be a Piece not moved out of its Place, there will be no Occasion to restore it.

IV. After the Bones are properly reduced, they must be covered with, first, What is to be done after the Jaw Bone is set. a Plaster, and then a Compress, dipped in *Sp. Vini*, and applied internally ; and another Compress sewed to a Piece of Paste-board in the Form of a half Jaw, is to be laid on externally. *See Fig. 9. Tab. VIII.* These are to be kept on by the Bandage with four Heads, perforated in the Middle, to let in the Chin ; or else it must be very carefully bound up with the particular Bandage for this Case, which we shall describe when we come to treat professedly of Bandages. But whenever the Jaw is found to be fractured on both Sides, it is usual to introduce and apply internally, after the Compress dipped in *Sp. Vini*, another made of thin Paste-board, perforated in its Middle, and accommodated to the Figure of the Chin, as at *Fig. 10.* In this Manner its Middle (*a*) that is perforated, is to be applied to the Chin ; and its two Extremities (*bb*) toward the Ears. But Fractures of this Part may be well enough cured without Plasters and Splints, where we can commodiously apply a Bandage : For the Bones are not very easily displaced, when they are once reduced. In what manner this Part is to be bound up, we shall make pretty evident, when we come to treat of Bandages in particular.

V. To forward the Agglutination of the fractured Jaw, after Phlebotomy, the Patient should be reconciled to rest as much as possible ; but above all he should strenuously avoid, particularly for the first Days, all Talk and Eating. It seems therefore to be much the safest Way to live upon, till the Jaw is grown firm, only fluid Aliments, such as Broths and Soops, poached Eggs, Gellies, and the like, taking Care not to lie on the Back, and strictly to avoid turning on the Face, or either Cheek. By which Means the Fracture will be well in about twenty or thirty Days : Especially if the internal Parts of the Mouth that are injured, be frequently moistened with a little *Mel Rosarum*. How the Patient should behave himself under the Cure.

VI. If the Fracture be attended with a Wound, it must be undone every Day, and treated as we have taught in *Chap. IV, N. VI.* till it be healed. An Example of a Fracture in both Jaws may be seen in *LE DRAN, Obs. Chirurg. 3. Tom. I.* but of the lower Jaw only, in *Obs. 8.*

* GOUVEUS indeed, dissuades us from this Method, thinking that the Bones will by this Means be again displaced ; but TURNER, (and some others) in his *Surgery*, gives an Instance where it succeeded ; and so does *LE DRAN, Obs. 3. Tom. I.*

C H A P. V.

Of a FRACTURE of the CLAVICLES, STERNUM, and HUMERUS.

Of a fractured Clavicle.

I. **T**HE Clavicle^a is extremely subject to be fractured both from its transverse Position, and from its Smallness; which happens either in its Middle, near the *Humerus*, or near the *Sternum*. But in which-ever of these Parts it is broke, that End next the *Humerus* always descends lower than the other, next the *Sternum*; from the Weight of the Arm, which was before sustained by the Clavicle and Head of the *Sternum*. And notwithstanding that Part of it next the *Sternum* remains immoveable, by the Descent of its other End, it can scarce happen but they will, in some Measure, collapse one over the other.

How a Fracture of the Clavicle is to be discovered.

II. It is no great Difficulty to know when this Part is fractured. For (1) it will be hardly possible for the Patient to lift up his Arm: (2) His Arm will hang inclining towards his Breast, whereas before it was straight, or tended rather backward: (3) And lastly, as the Clavicles are covered with scarce any Muscles, the Fracture will be greatly evident both to the Touch, the Eye, and the Ear; especially upon any small Motion of the Part.

The Prognosis of a fractured Clavicle.

III. When the neighbouring Parts are not affected, this Fracture is attended with no bad Consequences: But if the adjacent Veins or Arteries, or even Nerves are injured, there is generally great Danger. The Reduction of a broken Clavicle is not very hard to be effected, especially when the Fracture is transverse: Nor is it usual for the *Humerus*, with the Fragment of the Clavicle, to be so far distorted as not to be easily replaced with the Fingers. But the Difficulty is much greater to keep the Bone in its Place, when the Fracture is once reduced, especially if the Bone was broken obliquely. For which there are two Reasons: *viz.* the circular Bandages, with which the Bones of the Arms and other Extremities are usually held very firm, cannot be applied here, by reason of the Form and Situation of the disordered Part: And then the Weight of the depending Arm itself, soon pulls asunder what the Surgeon has been replacing. It is no wonder, therefore, if the Juncture of the Clavicle be often found either uneven or unfirm after its Agglutination. Yet we do not want Examples where fractured Clavicles have been very happily and firmly cured, especially when the Patient keeps himself quite free from Motion.

How the broken Clavicle is to be reduced.

IV. A Fracture of the Clavicle is to be reduced in the following Manner. The Patient must be placed on a low Seat, and an Assistant is to thrust his Knee against the Middle of the Patient's Back, between his two Shoulders; then laying hold of the Patient's Shoulders with each Hand, he must pull them gently and gradually backwards: By which Means the Clavicles will be properly extended. Whilst this is doing, the Surgeon must stand before, and endeavour to replace the Bone with both his Hands, ordering the Assistant to hold the Bone in that Position. He is then (1) to apply the narrow and thick Compress (*Tab. IX, Fig. 13.*) folded up at each End, so as fill up the Cavities above and below the Clavicle. Upon these (2) he is to lay two more narrow

^a A Fracture of the Clavicle is by *CELSUS* (*Lib. VIII, Cap. 8.*) called *Jugulum fractum*; but all the modern Surgeons and Anatomists give the Name of *Clavicle* to this Bone, and attribute a quite different Signification to the Word *Jugulum*.

Compresses,

Compresses, made in the Form of the *Letter X*. Over all these, he is (3) to apply a Piece of Paste-board (*Tab. VIII, Fig. 12.*) accommodated to the Shoulder and Neck, and first steeped in *Sp. Vin.* or Oxycrate. Then he must (4) place a Ball under the Arm, or bind it several Times with a thick Roller, to prevent the *Humerus* from subsiding. And lastly (5) the whole is to be discreetly bound up, and the Arm suspended in a Sash or Sling, that is put about the Neck. The Plasters that were used to be frequently applied in this Case, have been generally found useless.

V. As it is sometimes very difficult to keep the Arms from pushing inwards, which would disturb the Agglutination; it will be of Service to use a Wooden or Iron Instrument (*Tab. VIII, Fig. 13.*) in the Form of a T, so contrived as to keep back the Shoulders. The Sides of this Instrument are about the Breadth of three Fingers, and lined with Cloth or Leather. It is to be applied thus: *viz.* The two Arms AA, are to be placed against each Shoulder, and the perpendicular Part B, is to go against the Middle of the Back. Through the Aperture C, is passed a double Ligature to fasten it to the Body, the two Arms being first put through the Rings AA, which may be widened or narrowed at Pleasure. The tighter the perpendicular Part B is fastened to the Body, the more the Shoulders are by that Means drawn backward. But if they cannot be this Way drawn tight enough, a Compress, folded lengthways, is to be first placed between the Back and the Instrument: By which Means the Shoulders will be drawn more strongly backwards. The Rings AA, may be made of Iron or Leather, so as to be taken in, or let out, as there may be Occasion.

VI. Whenever there are any loose Splinters of the Bone that are intirely separated, which not only wound and hurt the Flesh, but obstruct the Meeting of the Clavicle; it seems altogether requisite to open the Skin and remove them, before the Reduction of the Bone, treating the Wound as usual. But if there should be any Splinters which still adhere to the Bone, and prick the adjacent Parts, or impede the Reduction; they must be also either taken off with the *Forceps*, (*Plate VIII, Fig. 1.*) or else forced into their Places, whereby they may be again united to the Bone. But to divide the Parts, and remove the Fragments, requires great Caution; lest some of the large subclavian Veins or Arteries be wounded in the Operation, and a fatal Hæmorrhage be thereby produced.

What is to be done in case of loose Splinters.

VII. The *Scapula* is usually fractured, either near its *Acromion* or Head, where it joins with the Clavicle, or in some other Part; which will be distinguished by the Eye, or the Touch. If in its *Processus Acromium*, the Reduction may be easily made, by lifting up the Arm to relax the *Deltoides* Muscle; or by pushing the Arm evenly upwards, and drawing the fractured Parts together with the Fingers; but then they easily slip away again, by any slight Cause, and so are difficultly agglutinated: More especially they are easily separated by the Weight and Motion of the Arm, and the Contraction of the *Deltoides* Muscle: Insomuch that there is scarce any body that ever cures a fractured *Acromion* so as to admit afterwards of a free Motion of the Arm upwards^a. In the mean Time all Means must be used to retain the replaced Bones in their right Situation: A Compress wet with *Sp. Vin.* is to be applied to the Fracture; a Ball is to be put under the Arm-pit to support it; the whole is to be bound up with

Of a Fracture of the Scapula.

^a Such is the Opinion of CHESelden, treating of this Bone, in his Anatomy.

the Bandage commonly called *Spica*, and the Arm is to be suspended in a Sash or Sling, hung about the Neck; and the Patient must rest himself without Intermission. But if the Neck of the *Scapula*, which lies under the *Acromion*, or its *Acetabulum* should be fractured, (which is a Case that as seldom happens as it is difficult to discover, by reason of its thick Covering) it is a hundred to one, but from the Vicinity of the Articulation, the Tendons, Muscles, Ligaments, Nerves, and large Veins and Arteries, there will follow a Stiffness and Loss of Motion in the Joint, a violent Inflammation, Swelling, and Abscess, with the worst of Symptoms, and even Death itself: As happened in a Case I saw, of a certain Professor at *Helmstadt* ^a. But when the Fracture falls on some other Part of the *Scapula*, the Symptoms are generally much milder.

How the fractured *Scapula* is to be reduced.

VIII. That the fractured *Scapula* may be set with the greater Readiness, an Assistant is to extend the Arm gently forwards: The Surgeon in the mean Time dextrously replacing the Fracture with his Hands, should apply afterwards the proper Compresses, and Slips of Paste-board, suitable to the *Scapula*, and first wet with *Sp. Vin.* or Oxycrate; which are then to be firmly bound on with the *Stellate*, or four-headed Bandage, as we shall direct at large in the third and last Part of his Treatise.

FRACTURE in the STERNUM.

Of a fractured *Sternum*.

IX. The *Sternum* is equally subject to Depressions and Fracture, from Falls or Blows, with the rest of the Bones. When either of these happen, the Part is not only uneven and painful, but the subjacent Arteries and Veins are also contused or ruptured; whence arise Pains in the Breast, Difficulty of Breathing, violent Coughs, spitting of Blood, or else Extravasations of it in the *Præcordia*, or between the Duplicature of the *Mediastinum*, with many bad Symptoms of the like Nature.

The Signs of a fractured *Sternum*.

X. The Signs therefore of a fractured *Sternum*, will be, in my Opinion, sufficient evident, from what follows. Namely, its Depression or Fracture will appear not only from the Symptoms beforementioned (*N. IX.*) but frequently also from the *Sternum's* being unequal or moveable to the Touch; especially when one Part grates against the other. The Depression of the *Sternum* will be also apparent, not only from the Symptoms of the preceding Section, but also from the Cavity or Inequality made in this Part, which is a Sign peculiar to this Disorder.

How the *Sternum* is to be replaced.

XI. In order to set the Fracture, if any Part of the Breast-bone be displaced, it will be very serviceable to lay the Patient on his Back, upon a Bed, or rather a Table, putting a hard Pillow, a large Piece of Cloth rolled up, a Drum, or other Cylinder under his Back, pressing down his Shoulders, by which Means the *Sternum* will be elevated and extended. And to facilitate the Reduction, the Surgeon must press the Sides of the Breast together, and shake them pretty strongly. By this Means you not only push the Ribs forwards, but at the same Time force what is depressed in the *Sternum* into its natural Situation. But when this Method is impracticable, or not proper, the Skin must be divided, and the depressed Part of the *Sternum* lifted up into its Place, by means of a Lever,

^a The same has been observed by CHESELDEN (*loc. citat.*) and by DOUGLASS.

commonly called an Elevator; or else by a Screw, gently wormed into the Part, and pulled upwards. Notwithstanding this Way of Cure is more operose and difficult than the former, it is preferred by GOUVEY (in his *Chirurgie veritable*) and PETIT (*de Morb. Off.*) as the best and readiest Method. As for the fittest Method of retaining the *Sternum* after its Reduction, we shall treat of that more at large, when we come to the Doctrine of Bandages. But if, as it sometimes happens after the Reduction, violent Pains continue under the *Sternum*, and if Blood should gather and suppurate internally between the Duplication of the *Mediastinum*, it will not be improper to trepan the lower Part of the *Sternum* (as PETIT advises) after the Manner we do the *Cranium*: And when the putrid Matter is discharged, and the Cavity cleansed, it should be carefully treated with some vulnerary Balsam. Lastly, if any Blood should be found extravasated in the Cavities of the *Thorax*, the Cure seems to depend entirely upon discharging this by the *Paracentesis*, in the Manner we have described under Wounds of the *Thorax*. As to the Business of Dressing, after the Application of Compresses dipped in warm Wine, or *Sp. Vin.* we must go on with that Kind of Bandage called the *Napkin-and-Scapulary*.

C H A P. VI.

Of FRACTURES in the Ribs, Vetebræ, Os Sacrum and Innominatum.

I. SOMETIMES the Ribs are fractured, or only fissured, in such a Manner, that barely some external and internal Part of them are hurt, and not moved out of the natural Places: Which Case is usually attended with no bad Symptoms, and is often scarce discoverable, the Bone growing together again of itself. But if the whole Rib be fractured, and some Part of it moved out of its Place, it is a more dangerous Case: For the costal Muscles, and the *Pleura* that lines the internal Cavity of the *Thorax*, will be very much disturbed, inflamed, or torn by the separated Fragments of the Bone. When a Rib is fractured, it projects either externally or internally, much in the same Manner as if it was a broken Arch: When it projects externally, the Symptoms are usually much the milder^a; but when it is driven inwards, the Case is much worse, especially if any of the Intercostal Veins or Arteries be divided so as to let Blood run into the *Thorax*. In Consequence of which, we need not wonder if violent Prickings, Inflammation, difficult Respiration, Cough, Fever, Spitting of Blood, Suppuration, Extravasation of Blood in the *Thorax*, or cellular Interstice of the *Mediastinum*, and other bad Symptoms should follow in Course; especially if the neighbouring *Viscera*^b be wounded; or more Ribs be broken at the same Time. If these be not timely remedied, they produce violent Fevers, Inflammation, and Ulceration of the Breast and Lungs, *Empyemas*, incurable *Fistula*, and *Caries* of the Bones; and sometimes Death itself will be the End,

^a Indeed GOUVEY denies that broken Ribs are ever drove outwards; but PETIT (*lib. de Morb. Off.*) witnesses that there may be such a Kind of Fracture.

^b All Fractures of different Ribs at the same Time are ranked by BOHN amongst mortal Wounds. *Lib. de Vuln. Leth. C. 3.* And I myself have been Witness to such a Fracture, where the Patient died in a few Hours.

particularly in a Fracture of more than one Rib at the same Time. It frequently happens, unless the Fracture be a simple one, that the soft Parts are punctured, and an external Wound made, by some sharp Piece of the Bone. If the Parts are wounded, it occasions sometimes a very profuse Hæmorrhage, often very difficult to stop, as the Passage is not easy to the Arteries beneath the Ribs. And if the Blood should not run into the *Thorax*, it can scarce be discharged from thence but by the *Paracentesis*, or else by dilating the Wound, when it happens between the bastard Ribs. If by any external Force the Cartilages should be separated from the Ribs, we term it a Fracture, and treat it in the same Method with other Fractures in this Part, which we are going to describe.

The Method of discovering a Fracture of the Ribs.

II. When the fractured Parts of a Rib keep in their natural Situation, they continue even and smooth to the Eye, and are unaccompanied with any considerable Pain: It is therefore difficult to discover the Fracture. But yet, upon slightly moving the same, it will be attended with some Pain, though it will the more readily grow together. But when the fractured Parts recede from each other, the Deformity will be apparent both to the Eye and Touch, and a Noise will be heard upon moving them. If a sharp Piece of the Bone should molest the *Viscera* internally, it will occasion the greater Part of the Symptoms mentioned at N. I. and from the Intensity and Malignity of those, we judge the Fracture to be more or less dangerous. But it also frequently happens, that a Fracture of the Ribs occasions a windy Tumor, called by the Greeks, *Emphysema*; formed by the Air insinuating itself, by a small Wound, between the Skin and Muscles, into the Substance of the cellular or adipose Membrane; spreading itself afterwards up to the Neck, Head, Belly, and other Parts, much after the Manner in which Butchers blow up their Veal.

How a slight Fracture of the Ribs is to be set.

III. In order to replace fractured Ribs, it is always previously necessary to inquire whether the Splinters project externally or internally. When the first is the Case, the Patient is to be placed on a high Table, and the separated Bones must be gently forced by the Fingers into their Places, the proper Compresses dipped in *Spir. Vin.* must be laid on, and then covered with Slips of Paste-board or Splints; and lastly, the circular Bandage, or else the *Napkin-and-Scapulary*. But when the latter is the Case, while the Patient retains a deep Breath, the Surgeon carefully compresses both Sides of the Rib with his Hands, agitating till they are properly fixed. What is farther necessary to be done in this Case, will come under the Head of Bandage; unless that the Paste-board is to be here omitted, and the Napkin not drawn very tight: But the Dressing need not be undone, unless it be over loose, and some Symptoms or the Patient's erect Posture require it. By these Means, Fractures of this Kind are usually cured in about three or four Weeks Time. Through the whole Course of the Cure, as *Celsus* (*Lib. VIII. Cap. 9.*) advises, the Patient must carefully avoid all Talk and Clamour, Passions and Anger, violent Motions of the Body, Smoke, Dust, and every thing that will occasion sneezing or coughing. But if the Reduction cannot be effected by the Means hitherto delivered, it may not be improper to try by some sticking Plaster, as in a Depression of the *Cranium* at *Book I. Chap. XIV. N. XXIV.*

What is to be done in the more dangerous Fractures of the Ribs.

IV. If any sharp Pieces of the Ribs should pierce the *Pleura*, it will occasion most violent Pains, a Difficulty of Breathing, a Cough, Spitting of Blood, Inflammation,

Inflammation, Fever, and other such grievous Symptoms: Therefore it will be proper to open the Skin and extract the Fragments which stick in the Flesh with the Fingers, Pliers, Hooks, or other proper Instruments. Unless this Method be followed, the Patient will be in great Danger; to prevent which, Phlebotomy, Clysters, cooling and Anodyne Medicines are to be used, and a thin Diet must be followed. This Method of Incision is also more particularly necessary when the sticking Plaster, and other Means advised, prove insufficient to reduce the Fracture.

V. When there happens to be a Wound of any of the Veins or Arteries which run under the Ribs so as to let their Blood flow internally, the Case will be much the same with the Wounds mentioned in *Book I. Chap. X.* And it seems then necessary to open the *Thorax* near the fractured Part, sufficient to admit the Finger, anointed with some Liniment, and dipped in some styptic Medicine, which is to be held upon the Vessels till the Blood stops. But when the Finger proves ineffectual, the divided Vessel must be discovered, and closed either with a Ligature or an actual Cautery, properly applied. And in order to discharge what is lodged in the Thorax, when the Wound itself is in the lower Part thereof, the Surgeon must dilate and keep it open with Lint, as was advised before in Wounds of the Thorax. But when the Height of its Situation in the Breast, near the upper true Ribs, will not admit of a convenient Discharge by that, a fresh and more convenient Opening or *Paracentesis* must be made in the lower Part of the Thorax; and the Wound in the superior Part must be closed. See *Book I. Chap. X. N. X.*

VI. When an *Emphysema* happens, it will be very proper to enlarge the Opening in the Skin, if too narrow, with the Scalpel; and to bring down the Tumor with Frictions and Bandage, carrying the Compression gradually towards the Opening, so as to expel the included Air by Degrees. But if there should be a Contusion also, it must be treated in the Method which we have already laid down, in the Chapter (XV. *Book I.*) of *Contusions*. If a violent Cough or Inflammation follow, it must be remedied by Bleeding, and other proper Medicines. See an Example in *LE DRAN, Obs. 29. Tom. I.*

VII. When any of the *Vertebrae* are fractured, either by a Fall, Blow, or any other Cause, without hurting the spinal Marrow; we may reasonably suppose that the Fracture is confined to some of the oblique or spinal Processes; and therefore the Patient will be in no great Danger. But when the Body of the *Vertebrae* is either broke or split by some external Force*, and the contiguous spinal Marrow bruised or compressed; all Parts of the Limbs and *Viscera* beneath that Vertebra become immoveable and rigid. No wonder then, if a speedy or slow-paced Death often follows, in proportion to the Degree of Damage. Here it may be also proper to recal to Mind, what has been said in the preceding Book, on Wounds of the *Medulla Spinalis*. And lastly, if the transverse Processes of the *Vertebrae* are broke, which incline towards the Cavity of the *Thorax*, it is scarce possible that the Heads of the Ribs which are there connected, should escape being fractured also; which makes the Case very deplorable.

* *GOUVEY* thinks the Body of the *Vertebrae* cannot be fractured, unless by a Bullet: But I have seen them from a violent Fall off a high Place, and the Patient died soon after, from bruising the spinal Marrow; as they generally do in this Case.

The Signs
of Fractures
in the *Verte-
brae*.

VIII. Fractures in the *Vertebrae* may be judged to be present from (1) considering the Nature of the external Violence, whether it be a great Fall, Blow, or the like; but more especially (2) from the Pains seated about the affected *Vertebrae*; and lastly (3) from the Manifestation thereof, to the Touch, Eye, and Ear.

How to re-
place the
fractured
Processes
or *Apophyfes*.

IX. When only the Processes of the *Vertebrae* are found broken, it will be much the best Way to force them into their Places with the Fingers, placing narrow Compresses dipped in warm Spirit of Wine on each Side the *Vertebrae*, and over them, Slips of thick Paste-board, to be kept on by the *Napkin-and-Scapulary*. For by this Means, the Bones of the *Vertebrae*, which are very soft and spongy, will quickly and easily grow together again.

How the
worst Kind
of Fractures
in the *Ver-
tebrae* are to
be treated.

X. If in any Case the Spinal Marrow should be divided, Death will be generally an inevitable Consequence. But to offer the Patient no Assistance because we despair, would seem cruel and uncharitable; therefore we must try our Skill, though our Attempt should be in vain: In order to which, the Surgeon must lay bare the fractured *Vertebra* with a Scalpel, and replace or else remove such Fragments as injured the spinal Marrow. The Wound is to be afterwards gently cleansed as usual, and dressed with the Balsams mentioned *Book I, Chap. II, N. XV*, clapping over them a Compress dipped in warm Spirit of Wine, or Lime-water, and Spirit of Wine camphorated, to be held on with the *Napkin-and-Scapulary*, till the Wound shall terminate either in a perfect Cure or Death.

Fracture of
the *Os Sa-
crum*.

XI. It sometimes also happens, that by a Fall or a Blow, the *Os Sacrum* becomes in like Manner fractured; which may be discerned to be broken, from considering the external Violence, the Pains, by the Touch, &c. as is usual in other Fractures.

How to set a
Fracture of
the *Os Sa-
crum*.

XII. As soon therefore as the *Os Sacrum* is found to be fractured, its Fragments are to be forced into their Places with the Fingers. But if any Part of it be depressed inwards, it may be convenient to introduce a Finger (that has first had its Nail cut close and been dipped in Oil or Butter) up the *Anus*, in order to thrust the depressed Fragment into its proper Place, to which it is to be directed externally by the other Hand. This being performed, we must apply some Plaster suitable for Fractures, with Compresses dipped in *Sp. Vin.* over it, to be kept on by the T Bandage; or the Plaster may be omitted and only the Compress and Bandage retained. And lastly, to facilitate the Agglutination, the Patient should keep his Bed quietly on his Sides for about a Fortnight: Or if he must needs sit at Times, let it be in a Chair without a Bottom, to avoid displacing of the Bone, from touching the Seat.

How the *Os
Innominatum*
is to be re-
placed.

XIII. When the *Os Innominatum* is broke, which seldom happens, it is readily discovered by the Injury and Symptoms in the neighbouring Parts, and is more particularly dangerous when the Patient discharges a brown and bloody Matter. In restoring this Bone, the Patient must lay down on his sound Side, the Bone is to be replaced with the Hands, covered with Compresses, dipped in *Sp. Vin.* and bound up with the Bandage *Spica*. Afterwards Bleeding, with cooling and relaxing Medicines must be used, and a thin Diet observed; and let the Patient lie either on the sound Side, or on his Back^a.

^a See ROONHUYB, *Obs.* p. 142. *Edit. Belg.*

CHAP. VII.

Of FRACTURES in the Bones of the Humerus, Cubitus, and Hands.

I. **T**HE *Os Humeri* is broke either in its Middle, which is the least dangerous; or else near its upper or lower Head, which is much worse, as being more difficult to cure, and producing more violent Symptoms, acute Pains, Tumors, and Inflammations. Indeed Fractures of this Part are usually very obvious to the Senses, being exposed to the Eyes and Hands: But then they require a different Treatment, according to the particular Part injured. It sometimes also happens, that the fractured Parts of this Bone keep their Places: But it more frequently falls out, that they slip one over the other; by which Means the fractured Limb becomes shorter than the sound one. But it will sometimes, though seldom, happen, that the two Parts of the Bone shall recede much from each other; by reason of the Weight of the Arm, which they sustain. If the first be the Case, the Fragments are usually more easily and readily replaced; but in the latter, there is required more Force and Skill to reduce the Bones to their Places, from whence they were removed: Especially if the Patient has tense Nerves and large Muscles, as is usually observed in strong Men.

Fracture of the Humerus or Fore-Arm.

II. In a Fracture of the *Os Humeri*, the Arm may be readily extended in the following Manner: Let the Patient be seated on a high Stool, and an Assistant lay firm hold of his Arm above the Fracture, keeping his Elbow gently bended: Then the lower Part of the Arm, beneath the Fracture, is in like manner to be taken hold of, and the Arm is to be gently extended forward, by endeavouring to remove easily each Part from the other in a right Line. Then the Surgeon himself lays hold of the fractured Part of the Arm, with both his Hands, and strives to replace the Bones, held in a due Extension by the Assistant, into their proper Situations; judiciously rolling up the Part with proper Bandages, agreeable to what has been said of them in general in the Introduction, and what we shall explain more at large in the particular Doctrine of Bandages alone. If one Assistant be not able sufficiently to extend the Arm of a robust Patient, the Office may be undertaken by two; or else thin Napkins or other Linen Bandages may be wound round each Articulation of the Arm, and given to several Assistants, to be pulled in opposite Directions, till the Limb be stretched a little longer than it naturally ought; and then the Surgeon is to replace the Bones: But if the Surgeon's Hands and Napkin prove insufficient, which is seldom the Case, HILDANUS's Girt, with the Sling (as described, *Plate VIII, Fig. 17.*) must be applied to the Arm above the *Cubitus*; by which you may extend it, and reduce the Bone to its proper Situation.

How a broken Arm is to be set.

III. The lower Part of the Arm, called by Anatomists *Cubitus*, contains two Bones; the *Radius* and the *Ulna*. A Fracture in this Part may therefore happen to only one, or to both of these Bones; and that, either in their Middle or Extremities. But when they are both broke together, the Bones are not only very easily distorted from each other, but are also replaced and joined together again with much more Difficulty. But if one only should be broke, whilst the other

Of Fractures in the Cubitus, or Lower Arm.

other remains whole, the fractured Parts do not much recede out of their Places, nor are they very difficult to reduce and retain. For the sound Bone is found to be a better Direction and Support in this Case, than either Splints or Bandages. When the Fracture happens towards the lower Head, near the *Pronator quadratus* Muscle, the fractured Part is strongly drawn (by that Muscle, and the intervening Ligament that is spread between the *Radius* and *Ulna*) towards the sound Bone, which makes it more difficult to replace. This is therefore a very material Circumstance to be considered in the *Prognosis* and Cure of this Fracture.

The Signs
of a Frac-
ture in the
Cubitus.

IV. A Fracture in these Bones of the Arm may be well enough discovered by the Signs common to Fractures in general. But whether one or both be broke, and which of them is the Bone and its particular Part fractured; these may be known by the Sight and Touch, and by properly moving the Joint in or out, as may be necessary. It is however much easier to discover a Fracture in the *Ulna*, from its Inability to support the Joint, as usual, than that of the *Radius*. The Ear will also frequently assist the Sight, in the Search after this Fracture: For there will be generally perceived a Grating of the Bones, upon moving the Patient's Hand in and out, whilst the upper Part of the *Cubitus* is held firm.

In what
Manner the
Radius is to
be set.

V. If the *Radius* is to be set or replaced, whose Fragment is contracted towards the *Ulna*, an Assistant must hold the Arm whilst the Surgeon inclines the Patient's Hand towards the *Ulna*, to draw back the contracted Part of the *Radius*. When this is done, he must carefully reduce them by Compression on each Side with the Palms of both his Hands, so as to restore the compressed Muscles, between the *Radius* and *Ulna*, and Fragments of the *Radius*, to their proper Places. The Arm is to be then bound up in the Method we shall hereafter deliver. And the Limb is to be put into a sort of Case, (*Tab. VIII, Fig. 14.*) made of Paste-board or light Wood, to be suspended in a Sling put about the Neck^a.

How the
Ulna is to
be replaced.

VI. In setting a Fracture of the *Ulna*, the same Method is to be observed with that of reducing the *Radius* as before, binding and suspending it in the same manner: But there is this Difference necessary to be observed, that in the Extension the Hand must be bent towards the Thumb and *Radius*, before the distorted Part of the *Ulna* can be compressed into its Place.

How we
are to treat
a Fracture
of both the
Bones.

VII. When both Bones of the *Cubitus* are broke, the Method of Cure will be much the same with that used to each of the Bones, when broke singly: Unless that there is required more Strength and Circumspection in replacing and retaining them, and the Bandage must be applied with greater Caution. And let the Surgeon, with the Palms of his Hands, compress the Patient's Flesh on each Side of the Arm; by which Means the two Bones will mutually accord in returning to their natural Situation. We must be also careful to observe, that, while the Arm continues a good while without Motion, the Mucilage of the Joint does not harden, or the Ligament become stiff, and the Arm or *Cubitus* be thereby rendered immoveable. It will be therefore not improper to unbind the Part every other or third Day, and to move it carefully and gently, a little backward and forward, and sometimes to foment it with warm Oil or Water; for by this Means, its natural Motion will be easily preserved.

^a Vide SCULTET. *Tab. LVI. & infra Tab. 38. Fig. 17.*

VIII. The Bones of the Wrist are seldom the Subject of Fracture, on account of their Smallness: But it sometimes happens to them, from the Stroke or Compressure of some hard or heavy Body. ^{Fracture of the Wrist.} When this is the Case, there usually remain but little Hopes of effecting a Cure. For the Ligaments and Tendons are here so numerous, and the Bones themselves are so very small, that it seems scarce possible to reduce them into their Places, or make them grow together again. And on this Account, the Joint of the Hand generally becomes stiff and immoveable: Or else violent Inflammations, Abscesses, Suppurations, *Fistulae*, and *Caries* of the Bones do thence arise; which, on account of the Softness of the Bones, and the Difficulty of discharging the Matter, are seldom remedied but by amputating the Hand. Agreeable with this, RUYSCH (*Obs. Anat. Chirurg. pag. 10.*) among others, instances a Fracture of this Kind, which, after three Years Treatment, remained still uncured.

IX. But that the Surgeon may not seem to be altogether negligent on his Part, ^{How a Fracture of the Wrist is to be treated.} he is rather to try what he can do in the Case, than to leave the Patient destitute of Help. It will be therefore most proper for an Assistant to lay hold of the Hand and Arm, above the fractured Wrist, and to extend them as much as is sufficient, in opposite Directions. While this is doing, the Surgeon must use all his Endeavours to restore the Fragments to their proper Places, with his Hands: And after he has very curiously reduced the Fracture, it is to be bound up with a suitable Bandage.

X. As the *Metacarpus* is much more subject to Fractures than the Wrist, because its Bones are larger; upon the same Account it is also more easily replaced and cured. ^{Fracture of the Hand, or Metacarpus.} There can be hardly a better Method of reducing this Fracture, than that of spreading the Hand upon a smooth Table by an Assistant, the Surgeon carefully using all his Endeavours to replace the Bones with his Fingers, securing them with a proper Bandage. An Instance of a Fracture in the Wrist with a Wound, may be seen in LE DRAN'S *Obs. 56. Tom. I.*

XI. When one or more of the Bones in the Fingers are broke, the Surgeon's ^{Fractures of the Fingers.} principal Business is, to carefully replace what has been removed, and to roll up the Finger a little Way with a narrow Bandage, and then to bind it firmly to the next sound Finger. If the Thumb is fractured, it must be supported with small Splints, and secured with a proper Bandage. The Method of commodiously applying the Bandage when several of the Fingers are broke at once, will be declared hereafter in the Doctrine of Bandages. But when the Hand or a Finger is so violently mashed as to have no Room to expect a Cure, it is more advisable to cut it entirely off, than to constantly torment the Patient, and perhaps put him in Danger of his Life.

CHAP. VIII.

Of a fractured THIGH.

I. **T**HE Thigh-bone, though the largest and stoutest in the whole Body, ^{Fracture of the Thighs.} is frequently broke after several different Manners; and that either in its Middle, or towards its Heads and Articulations: But more frequently near that Part which Anatomists call its Neck, near its Articulation with the Hip-bone. Which, whenever it happens, is very difficult to set, and more difficult to retain in its Place. When the Bone is broke in two Places at once, the
 Danger

Danger is still greater: And if the Patient should escape Death, which they usually do not, it is a common Case for him to be ever afterwards lame. Sometimes the Bone is broke transversely, sometimes obliquely; and at other Times the Ends slip one over the other, which makes it a very bad Case. For the Muscles of this Part being very robust, and strongly contracted, draw the lower End of the Bone with a considerable Force upward, so as to make it require a considerable Strength to extend and replace it. The oblique Fracture more frequently slips out of its Place again than the transverse, and generally leaves the Thigh somewhat shorter than the other, notwithstanding the Surgeon has performed his Duty with Exactness. It is therefore necessary to use in these Cases, besides the Means to be hereafter mentioned, a more strict Bandage, than in the transverse Fracture, to prevent the replaced Bones from being easily moved.

How a Fracture of the Thigh is to be set.

II. In reducing a fractured Thigh, we are to consider whether the Bone be broke near its Neck, or in some other Part: Which Consideration is always very necessary for the better replacing and binding up the Limb. Whenever, then, a Fracture of the Thigh-bone happens, either in the Middle or towards its lower Head, it is to be extended and replaced with the Hands like other Fractures: excepting that the extending Force here required, especially in robust Patients, must be much greater. Therefore more and stronger Assistants are to be here employed, who are sufficiently to extend the Limb with their Hands; or, where their Hands will not suffice, Slings, Napkins, or Linen Bandages may be bound round each Head of the Thigh, whereby the fractured Bone may be extended both Ways, while the Surgeon cautiously reduces the Fracture with his Hands, and treats it with a proper Dressing.

The Girt or Belt of HILDANUS.

III. But when the Extension cannot be performed effectually by the Hands, Slings, nor Bandages, which is a Case that seldom happens, we must then have recourse to the Belt or Girt of HILDANUS, *Tab. VIII. Fig. 17.* which is to be drawn and buckled very tight above the Knee, being first introduced through the Eyes of the Hooks A A, upon which is to be fastened a strong and small Rope B B, at the Middle, C, whereof are to be applied the Hands of the Assistants, or Napkins, &c. by which Means a sufficient Extension may be made, in order to replace the Fragments in their former Situations. Nor is this Contrivance restrained to the lower Limbs only; for it may be applied upon Occasion, to extend Fractures of the *Humerus* and *Cubitus*. If a fractured *Cubitus* is to be extended, the Girt is to be fastened above the Hand; if the *Humerus*, above the Elbow.

Of the compound Pulley, or Poly-spaßon.

IV. If the last Method of Extension shall prove ineffectual by itself, it seems every way necessary to try if any thing can be done more to the Purpose by the Pullies of *Tab. VIII. Fig. 15.* The Hook A, of one Pulley, is to be fastened upon the Rope of *Fig. 17.* at its Part, C; the Hook of the other Pulley B, is to be hung upon the Ring A, of the Hand-screw B, of *Fig. 16*; which is to be first screwed tight into some Beam or Rafter. Then, the Patient being held firm, about the other Head of the fractured Limb, by Means of Slings, Napkins, or other strong and long Linen Bandages, to prevent his giving way to the Extension; the Rope C, put through the Pullies D, and E, of *Fig. 18.* must now be drawn through, till the Thigh-bone be sufficiently extended, so as to admit of a convenient Reduction thereof by the Surgeon. Here it is to be observed, that the more Wheels the Rope passes round in the Pullies D, and E, of

of Fig. 18. the more easily and gradually will the Extension be performed, in-
somuch that by this Instrument one Man may draw more than ten without it.

V. When the Neck itself of the Thigh-bone is broke, to which, from its oblique or transverse Direction, and spongy or brittle Substance, it is very subject; it makes a Fracture not only very difficult to reduce, but such a one also as can be seldom cured without leaving the Limb lame or shorter than the other, as HILDANUS, (*Cent. V. Obs. 86.*) RUYSHCIUS, and others testify. Now the Reasons for this Calamity are more than one. For (1) the Fragments cannot, but with great Difficulty, be pressed into their right Places, by Reason of the great Thickness and Strength of the Muscles which cover them: (2) It seldom happens that the Bones can be retained in their natural Position, after they have been very well set: Because the Muscles, which pass over and are inserted a little below the Neck of this Bone, draw its lower Part upwards. And both these generally happen the more easily, (3) because of the oblique Position of the Neck of this Bone, which is inserted into its Head in a Direction not perpendicular nor parallel, but as it were sloping on one Side of the same: As will evidently appear upon viewing this Bone in a Skeleton. So that we have hence none of us any occasion to wonder, if Lameness and other bad Accidents follow as Consequences of this Kind of Fracture.

A Fracture
in the Neck
of the
Thigh-
bone.

VI. To the foregoing Reasons we may add, (4) that it is very difficult to discover when the Neck of the Thigh-bone is fractured, the Case being almost always taken for the Head of the same Bone being slipped out of its *Acetabulum* or Socket: Till first PAREY (*Lib. XIV. Cap. 21.*) then SCHENCKIUS (*Obs. XI, Lib. 5.*) after them the celebrated RUYSCH^a (when the Observations of the two former were forgot) and, since him, several other eminent Surgeons and Physicians^b have made it very evident that the spongy Neck of the Thigh-bone is, and may be oftener broke in two, than its Head, defended by very strong Ligaments, be pushed out of its deep Socket by any external Violence. Of this considerable Observation, the Physicians and Surgeons of not only former, but even the last Age, were so generally ignorant, that they never in the least suspected the Case to be a Fracture, but treated the Patient as if the Thigh had been luxated, tormenting and miserably distorting the Member with the Machines used in that Case. Since, therefore, this Method of treating the Patient has been found by Experience to be not only fruitless, but barbarous; it is highly necessary we should recommend another Practice, and such as might prevent those acute Pains, violent Inflammations, and many dangerous Symptoms which might otherwise ensue.

The Diffi-
culty of dis-
covering a
Fracture in
the Neck of
the Thigh-
bone.

VII. When we think the external Force to have been sufficient to produce a Fracture; when the Patient cannot bear any Stress upon the Limb by setting his Foot to the Ground; when very acute Pains are felt about the Articulation itself; and when we find the affected Limb shorter than the sound one, it being an easy Matter to turn the Foot almost round from one Side to the other, and perceive any cracking or grating of the Bones in that Motion, we may then reasonably suppose that the Neck of the Thigh-bone is fractured. We must

How this
Kind of
Fracture is
to be dis-
covered and
cured.

^a In *Theaur. Anat.* VIII. Tab. III. Fig. 1. and *Thef.* IX. Tab. I. Fig. 1.

^b CHESELDEN, *Anatom.* upon the Bones of the lower Extremities, and in Tab. VI. G, H. DOUGLAS, *Philosop. Transact.* N. CCCLXXXI Ann. 1716; and PETIT, on *Diseases of the Bones.* SALTZMAN, *Dissert. de Fractura Femoris frequentiori*, and others.

then carefully avoid the violent Extension of the Limb, which was used formerly under the Notion of a Luxation, by the Instruments contrived by SCULTETUS, and others, for that Purpose. Our Business here is, to extend the Limb very gently and gradually, till the disordered Limb be of the same Length with the sound one; and this by Means of a Napkin, proper Slings, or the Hands of a stout Assistant fastned round the Foot, or else by the preceding Girt and Pulley: In a Manner by which we may be able to rejoin, in some Measure, if not perfectly, the Neck of the Thigh-bone with its Head still firmly adhering in its Socket. And though a Shortness of the Limb, or Lameness is generally left behind after this Fracture; yet because there are some cured without those Attendants, I must approve, as very useful, such a strict Bandage as may apply and retain the Neck to the Head of the Bone, so as that they may gradually grow together again. For which Purpose, we usually apply the Bandage called *Spica inguinalis*, in this Case; then a large and broad Linen Cloth or Napkin is placed between the Thighs, to keep the Body of it from subsiding; and lastly, Ligatures are put about the Knee and Ankle, whereby the Foot is fastened to the lower End of the Bed, with a little Pad of Straw, to prevent the Limb from being contracted upwards: But we shall describe all this more at large, when we come to the Doctrine of Bandages. Indeed PETIT teaches, that this Kind of Fracture is to be bound up simply in the same Method with other Fractures of the Thigh; but that this is not reasonable, the Experienced herein will readily allow. Having proceeded thus far regularly, and placed the Patient in as convenient a Posture as possible, we must all along observe, with a strict Eye, whether the afflicted Member be either equal or shorter than the sound one. If it should be found to become shorter, there will be great room to suspect that the Neck of the Thigh-bone is slipped out of its Place again: And therefore it must be gently extended again, after unbinding it, till it becomes of the same Length with the sound one as before. But when the Foot of this continues of the same Length with that of the sound Limb, there is great room to hope that the Patient will be happily cured; if continued Rest and a proper Diet be regularly observed. What remains, is to be left to Nature.

How such a
fractured
Thigh is to
be retained
in its proper
Situation.

VIII. If we had an Instrument that would keep the fractured Thigh properly extended and of the same Length with the sound one, for about fourteen Days, or till the Cure was perfect, we could go on with much more Certainty and Success, in the Cure of Fractures in the Neck of the Thigh-bone, than we do. He therefore would be Author of a no small but important Advantage that should contrive a Machine fit for this Purpose. For though HILDANUS has described (*Cent. V. Obs. 86.*) an Instrument proper for extending Thighs which are obliquely fractured; there is yet great room to doubt of its Fitness for this Kind of Fracture. For he does not, that I know of, supply us with any Instances of Extensions or happy Cures that have been made by this Instrument. But till we have a more proper Machine contrived, and when the other Means are not found of themselves sufficient, it will not be amiss to use the forementioned Instrument of HILDANUS; or, when that is also of itself insufficient, to add the Straw-pad, the large four-headed Bandage, and the rest of the Apparatus described by HILDANUS; or to bind two long Napkins about each Groin, fastening them by Nails or Rings to the Head-bed-posts or Sides, so as to retain the Patient's Body sufficiently firm from descending. But that the lower

Part

Part of the Limb may not give Way upwards, a Ligature or Bandage is to be put round the Knee and Ankle, to be fastened to the Bed's Feet, as we observed at § VII. by which means the Limb may be retained in its proper Posture till the broken Neck of the Thigh-bone be joined firmly together. The same Method of Binding and Retaining may be also useful in other Fractures of the Thighs, but it is found not only useful, but really necessary in oblique Fractures of this Limb. But to prevent the Napkins or Ligatures from galling the Groins, it may be sometimes proper to interpose soft Compresses or Lint; and for Advice concerning the proper Posture in which a broken Thigh is to be retained, besides what has been briefly said at *Chap. I. N. XXXVI.* we shall be more full and particular in the Doctrine of Bandages^a.

IX. If a Fracture of the Thigh be accompanied with a Wound, it makes the Case very dangerous and difficult to cure: And if these Accidents should happen to be inflicted on the neighbouring Joint, Death is generally the Consequence; more especially when any of the large Blood-vessels are wounded, as must be evident from the great Hæmorrhage. So also is the Fracture dangerous, when the Wound is seated in the back Part of the Thigh; because it is with great Difficulty to be cleansed and dressed.

A Fracture
of the
Thigh with
a Wound.

X. In these Fractures with a Wound, the eighteen-headed Bandage, *Tab. IX.* *Cure.* *Fig. 4.* is to be used for the Dressing: This is described at large in our third Part, upon Bandages. But if the wounded Part be very much contused, so that extravasated Blood be lodged under the Skin and about its Interstices, it is to be carefully opened by several Incisions of a sufficient Depth, that the extravasated Blood, which would, in a short Time putrify, may be by this means discharged. The injured Parts are to be afterwards washed with *Aq. Calcis* mixed with a fourth Part of *Sp. Vin. Camph.* or some such resolving Liquor, till the contused Parts are digested.

XI. When this Kind of Fracture is accompanied with Loss of Blood, which is not very violent, nor the Bone near, the Wound is to be dressed with dry scraped Lint, properly folded, so as to fill the Wound: More and larger Compresses are to be laid over these, and the whole is to be retained with a proper Bandage, as is usual in Hæmorrhages. But if the Flux be greater, we recommend the Use of astringent Liquors, such as are used to stop the Hæmorrhages of Wounds, especially the most highly rectified Spirit of Wine, which is here found to be extremely serviceable and effectual: But if it run still more vehemently, from an Artery, the Vessel is to be first discovered by the *Tournequet*, and afterwards secured by Ligature. When this Kind of Fracture is attended with very great Hæmorrhage, and a violent Splintering of the Bone from Gun Shot, so as to indicate the crural Artery to be lacerated; if our Desire is sincerely to save the Life of the Patient, our best Method will generally be, to amputate the Thigh and tie up the Artery in Time: For by this means the Patient will be more easily preserved, than if we strive to save the lower Parts of his Limb; for the crural Artery is so large that it seldom grows together, and if it does, the lower Parts are soon seized with a Gangrene. After the Blood is stopped and the Wound cleansed, the Fragments of the Bone may

When accompanied
with Hæ-
morrhage.

^a In simple Fractures of the *Femur* or *Tibia*, the eighteen-headed Bandage may be properly applied.

be replaced, and the Limb carefully bound up with Compresses, Splints, and the Bandage with eighteen Heads, defending it in a Case of Straw, by the *French* called *Fanons*. The Wound is to be afterwards unbound every Day, cleansed from its Matter, and dressed with some digestive Ointment or vulnerary Balsam, till it be healed. Instances of Fractures of the Thigh with a Wound may be seen in SCULTETUS, *Obs.* 77 and 78. and PURMAN, *Obs.* 63.

AN EXPLANATION of the EIGHTH TABLE.

Tab. VIII.
explained.

Fig. 1. Is a sort of large and sharp *Forceps*, proper to cut off the Splinters or Fragments of Bones, which stick out: But to make them cut the easier, the Handles should be two or three Inches longer than the Figure.

Fig. 2. Is a simple Hook.

Fig. 3. Is a double Hook, serving for various Purposes in Surgery and Anatomy.

Fig. 4. Is a Needle, for taking up Arteries with a Ligature in Hæmorrhages, and many other Cases. A, is its blunt Point, B, its Eye transmitting the Thread, C, its little Head.

Fig. 5. Is a Case to hold the subsequent Instrument, which is used to hold and apply the *Lapis Infernalis*, or Caustic Stone.

Fig. 6. The Instrument itself, made of Steel, for holding and conducting the said Stone. *a*, the Nippers which lay hold of the Stone, *b*, the little Ring which shuts and holds them fast upon the Stone, *c*, the other End of the Instrument used as a sticking Quill to support the Lips of Wounds.

Fig. 7. Exhibits the Figure of a Splint, made of thin Wood or Paste-board, to be used in Fractures of the Arms and Feet: Its Breadth should be about three or four Fingers, and its Length suitable to the Size of the Limb.

Fig. 8. Is a Paste-board Splint, such as is sometimes used in Fractures of the Nose: Its Size is to correspond to that of the Nose.

Fig. 9. Is a Splint of Cap-paper, suited to the lower Jaw, when fractured only on one Side.

Fig. 10. Is a double Splint of the same Kind, for the lower Jaw, when fractured on both Sides: It is to be applied so that the Aperture (*a*) in the Middle may let in the Chin: But its two Extremities or Wings (*bb*) which may be folded together in the Middle (*a*), are to be applied towards the Ears.

Fig. 11. Is a Compress, in Form of an X, to be used in Fractures of the Clavicle.

Fig. 12. Is a Paste-board Splint, to be laid over the former Compress, in the same Fracture.

Fig. 13. Is an Iron or Steel Instrument in the Form of a T, useful to retain the Shoulders in a proper Posture, in Fractures of the Clavicle. AA, its transverse Part, to which are fastened Iron Rings, to retain and keep back the Shoulders. B, its perpendicular Part going down the Back. C, an Aperture in its lower End by which it is to be fastened with a Ligature round the Waist, to be tied before on the Belly. See Chap. V. § V. foregoing.

Fig. 14. Is a Paste-board Case, in which a fractured Arm is to be lodged after it has been set and dressed: Its Size is to be answerable to the Arm.

Fig. 15.

Fig: 14.



Fig: 15.

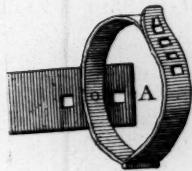


Fig: 17.



Fig: 17.

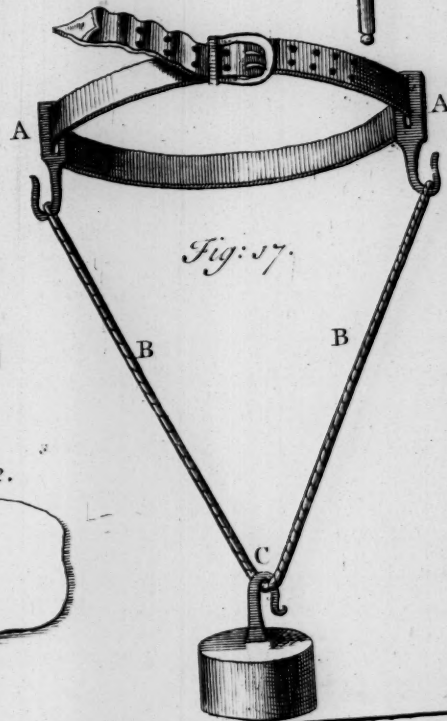


Fig: 18.



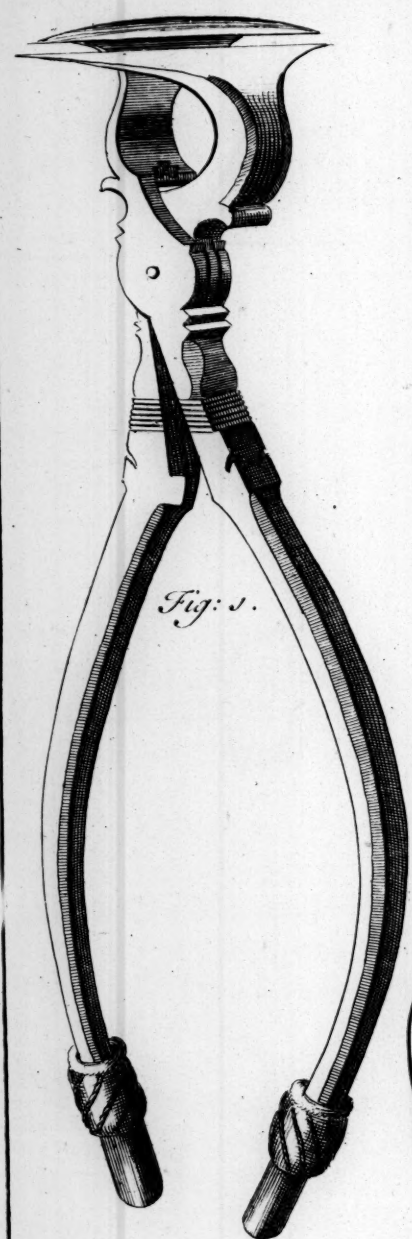


Fig: 2.

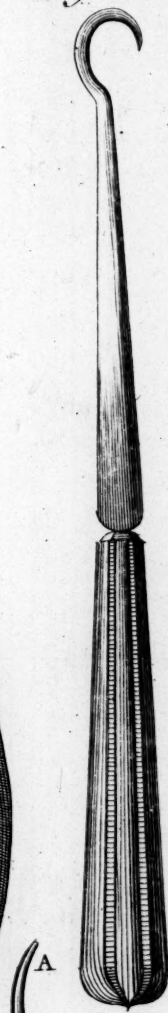


Fig: 3.

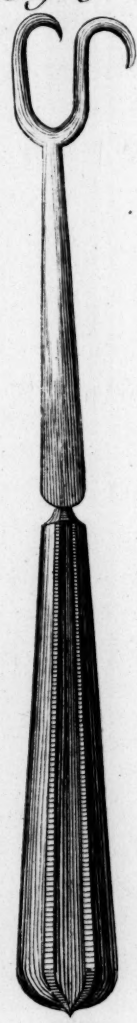


Fig: 5.

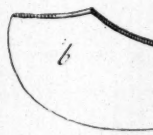
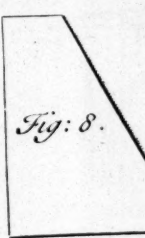
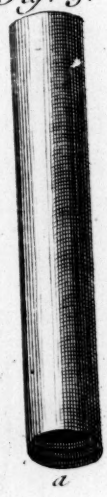


Fig: 6.

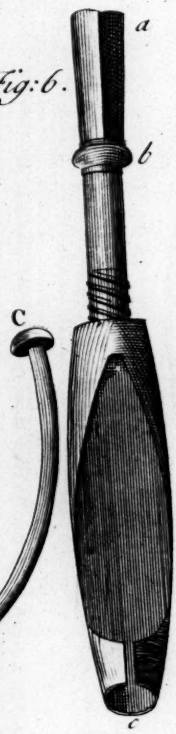


Fig: 4.



Fig: 7.

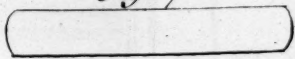


Fig: 8.

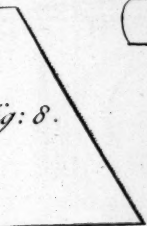


Fig: 9.



Fig: 14.



Fig: 15.



Fig: 10.



Fig: 16.

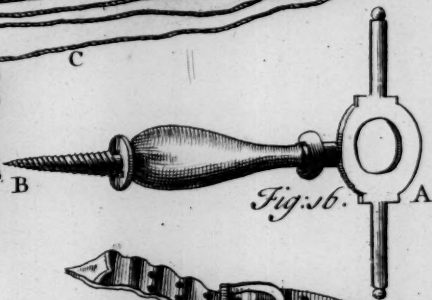


Fig: 13.

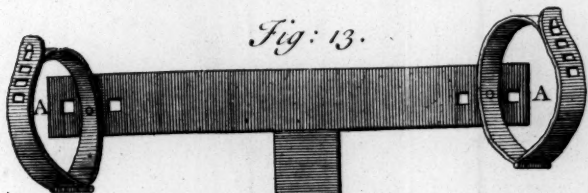


Fig: 11.



Fig: 12.



Fig: 17.

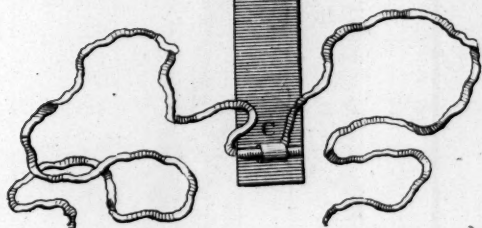
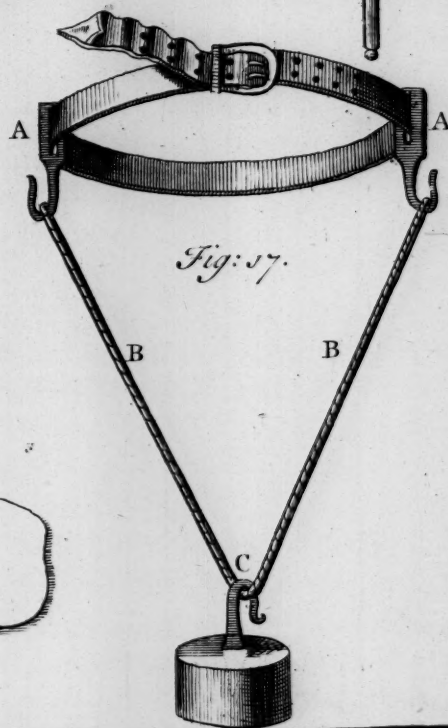


Fig. 15. Is a *Polyspaston*, or compound Pulley used to extend Fractures, described before at *Chap. VIII. § IV.* A and B, are two Hooks, by which the Instrument is fastened on both Sides. C, the Rope, by drawing which, an Extension is made upon the broken Limb. D, and E, are the two Pullies, consisting of several Wheels, by which the Force of the Drawer is very much increased.

Fig. 16. Is a strong Iron Screw, whose Worm or Thread B, is to be forced by the two Handles, into some Beam or Rafter; and upon its Ring A, is to be hung the Pulley E, foregoing.

Fig. 17. Is the Girt of HILDANUS, sometimes necessary to make Extensions upon the upper and lower Limbs: AA, two Hooks, upon which is hung the Sling or Rope BB; C being the Place where the extending Force is to be applied. See above *Chap. VIII. N. XIII.* The Girt should be three or four Fingers wide, and a Foot and a half long.

C H A P. IX.

Of a FRACTURE of the PATELLA, ROTULA, or KNEE-PAN:

I. IN order the better to understand and cure a Fracture of the *Patella*, it is previously necessary to learn from Anatomy, the Manner in which it adheres by Means of Ligaments and Tendons to both the Leg and Thigh; where we may also observe, its Ascension with the contracting Muscles upwards in extending the Foot, its Descension upon bending the same, and the great Force it sustains both Ways in violent Motions of the Body. When a Fracture of this Bone happens, from a Fall, Blow, or any other external Violence; the Course of the Fracture is either longitudinal, transverse, or in several Directions at the same Time: But of all, the transverse Fracture is most frequent. The longitudinal happens much seldomer, and is more readily cured; because the Fragments in this Case, generally keep in their right Places*. But when the Bone is broke transversely, and into many Pieces, the Case is usually much more dangerous. For though the lower Part of the Bone keep in its Place, as being not annexed to any Muscles; yet the superior Part of the Bone is drawn upwards, by the very strong Muscles to which it is joined, which makes it very difficult to reduce and retain.

The Nature of this Kind of Fracture.

II. The Discovery of this Kind of Fracture, is usually Matter of no great Difficulty. For it may be easily perceived, by the Eye and the Touch, whether the *Patella* be sound or divided; and also, when it is divided, whether it be broken transversely, longitudinally, or into many Pieces: Whether the Fragments adhere to each other, or are separated at some Distance. In examining this Fracture, forcible Flexures of the Knee are to be avoided as of no Service, but very painful and pernicious; because by this Means, the Fragments are pulled farther from each other, and PETIT gives an Instance of Death occasioned

A Fracture of the Patella easy to discover.

* Indeed, GARENGEOT (*Lib. de Instrum. Tom. II. pag. 310.*) thinks, that this Bone cannot be broke longitudinally; but that this Case sometimes happens, has been shewed by PETIT, among many others, in his Chapter of a fractured *Patella*,

thereby,

thereby. But it sometimes happens, through the Obesity of the Patient, and the little or no Separation of the fractured Parts, that this Case is not so soon to be discovered as is otherwise common. But then the Fracture is also less dangerous; for the Juice of the Bone, of which the *Callus* is formed, cannot so easily insinuate itself into the Articulation, whereby the Knee would become rigid and immoveable, which frequently happens in some Fractures of the Bone.

Prognosis.

III. It is generally a very difficult Matter to make a perfect Cure of this Fracture, as those experienced herein have often found. For if we may believe Practitioners, the Joint is generally left either rigid, or at best its Motions are performed with Difficulty. For, besides the Insinuation of the ossific Juice, which was destined to the Formation of *Callus*, into the Recesses of the Articulation; the Mucilage also, which lubricates the Joint itself, mixes and indurates with it: So that the Bones of the Leg and Thigh being joined together like two Pieces of Wood with the strongest Glew, the Joint becomes stiff, the Bones grow together and become like one. And this happens the more readily because of the long continued Inactivity of the Joint till the Bone is united, which is extremely necessary in these, and especially in transverse Fractures; by which long Inactivity, the lubricating *Mucus* of the Joint generally grows thick and hard. But it also usually happens, that the Tendon which sustains the *Patella*, and chiefly directs the Motion of the Joint, is violently contused at the same Time, and from the same Cause with the Fracture of the *Patella*: Upon which Account, also, the Motion of the Knee is greatly impeded or wholly destroyed. We therefore need not wonder that those who have once broke one of their Knee-pans, should be so subject to frequent Falls, and in Consequence of them break the other; since the violent Contusion of this Tendon always leaves an incurable Weakness in the Joint.

Cure.

IV. With regard to the Cure of a fractured *Patella*, it must be attempted in the following Method: In a longitudinal or perpendicular Fracture, the Patient must be laid upon his Back, and extending his Foot, the Surgeon in the mean Time replaces the Fragments on each Side with both his Hands, binding them up carefully with the uniting Bandage; which must be applied here in the same Manner with that used in large Wounds of the Belly and Fore-head, which we have before taken Notice of, and shall describe more largely in the Doctrine of Bandages. But when the *Patella* is broken transversely, or into several Pieces, the Patient being put in the same Posture and extending his Foot as before: The Surgeon is then carefully to endeavour to bring together, compress, and replace the Fragments of the Bone in their natural Situations, with the Palms of his Hands, Thumbs, and Fingers, retaining them firm with the Application of a Plaster in Form of a half Moon (*Tab. IX. Fig. 2.*) or perforated (as at *Fig. 3.*) and then the Foot of the afflicted Member is to be bound up and placed so that it cannot be easily bent or otherwise disturbed. We intend to be more particular on the whole Business of the Cure, in the Doctrine of Bandages. But notwithstanding there are to be found several particular Machines invented by Surgeons for retaining this Kind of Fracture;

* SOLINGEN recommends an Instrument of this Kind in his *Surgery*, in the Chapter of a broken *Patella*: and in *Tab. XV. Fig. 26. Edit. Amstel, 1698.* we find the Machine delineated.

GARENGEOT (*Lib. de Instit. Chirurg.*) has also described another; and we are acquainted with

they

they all seem to be much of such a Make as to fall vastly short of being sufficient for the present Design. But to prevent the replaced Bone from being disturbed or broken a-fresh, which is an Accident we find often happens; it must be carefully observed that the Patient do not any way exercise his Leg till after the Expiration of the ninth or tenth Week. For a Fracture of the Knee-pan is seldom sufficiently united before that Time: And such as use their Legs before that Time, generally halt in Walking, as RUYSCH (*Obs.* 3.) observes. Further, upon this Kind of Fracture, the Observation which PURMANNUS has collected in his Surgery (*P.* iii. *C.* 21.) deserve to be consulted.

CHAP. X.

Of FRACTURES in the Bones of the LEG and FOOT.

I. **T**HERE is but little new to be said on Fractures of the Leg and its two Bones, the *Tibia* and *Fibula*, which has not been before observed here: Fracture of the Leg So that there is no Occasion for more than the general Directions, which we have before laid down, to be observed in the Cure of every Kind of Fracture: viz. that the broken Bones are to be properly extended by the Hands or Slings, and then accurately replaced; to be afterwards properly bound up, and retained in the most suitable posture. This I have further to observe, that sometimes both the Bones, and at other Times one of them only are broken: If both, it seldom happens that each of them are broke directly in the same Place, but one of them a little higher than the other. If the *Tibia* alone be broke, it is easily discovered, it being placed so near the Skin: But if the *Fibula* alone, which is buried under so many Muscles, the Fracture is not so easy to be discerned. And when only the *Fibula* is broke, the Patient is generally under much less Disorder: In such a Manner, that it frequently permits them to walk. But to obtain a proper Knowledge of the Disposition of this Bone when it is fractured, the Calf of the Leg is to be grasped by one Hand, whilst the other Hand moves the Foot; and in the mean Time the Hand which holds the Leg will perceive whether and where it is fractured.

II. If as it frequently happens, a Fracture of the *Tibia* should be accompanied with an external Wound of the Skin; this must be first well cleansed, and the Splinters of Bone, with all foreign Bodies, removed: Then, the broken Bone, after a proper extension, may be reduced into its right Place, the Hæmorrhage, if there be any, may be afterwards stopped, (as we shewed at *Chap.* VIII. § XI.) and the Limb then be bound up firmly with the eighteen-headed Bandage, cut somewhat in the form of a Book, as at *Tab.* IX. *Fig.* 4. which we shall demonstrate more fully hereafter in *Chap.* VIII. of Bandages. But if any Fragments of the Bone should stick out so as to obstruct its Reduction, they should be first removed by a Pair of sharp *Forceps*, or a fine Saw, before any Attempt be made to reduce or bind up the Fracture. Having proceeded rightly so far, the last Step is, to place the Limb in a Straw Case, or else in a Brass Frame (*Tab.* IX. *Fig.* 9.) purposely accommodated to retain Fractures of the *Tibia*; renewing the Dressing and Bandage daily, 'till the Wound be healed. Sometimes little Pieces of the Bone will be set at Liberty and exposed to Sight by

the Suppuration, in the Course of the Cure; which are to be then laid hold of, removed, and the Cure continued as before. An Example of a fractured *Tibia* with a Wound may be seen in *SCULTEIUS*, *Obs.* 82, and 84.

PETIT'S
Machine for
these Frac-
tures.

III. A very useful and proper Machine or wooden Case for retaining the preceding Fracture has been also contrived and described by *MONS. PETIT*, a celebrated Surgeon of *Paris*, first in the *Act. Acad. Reg. Paris. Ann.* 1718. and afterwards in his Treatise of *Diseases of the Bones*, from whence *GARENGEOT* transferred it into his Book of *Chirurgical Instruments*. We chuse to exhibit the Machine rather from the *Act. Reg. Paris.*^a than from the Inventor's *Book on the Bones*, or *GARENGEOT's* of *Instruments*; because in the two latter, the Instrument is represented only put together, and therefore may not be intelligible to some, as if exhibited in a double Light, according to the other. You have it therefore first whole or put together, in *Tab. IX. Fig. 11.* and then separated into its component Parts at *Fig. 12.* The Basis or principal Part of the Machine *AA* (*Tab. IX. Fig. 12.*) is to be gently put under the broken Leg (after it has been first set, the Wound properly dressed, the whole bound up with the Bandage of eighteen Heads, and defended with Splints tied on with three Strings, as is usual.) The two lateral Parts of the Case *BB*, and its Front *C*, which serves as a Sole to the Foot, are fastened together by the Hinges *DD*, and kept shut by the Hooks *EE*, as may be seen at *Fig. 11.* by which Means the Foot cannot slip or shake, but is held firm and easy to the Patient. *FF* is the lower Part or Foot of the Machine, serving as a Foundation to the rest. At its End *GG*, it is joined by Hinges to the preceding Floor *AA*, whose sloping Part slides under the Thigh. Over the Floor *AA*, Pieces of strong Tape or Ticken are to be nailed tight to the Sides, upon which the Limb rests easier than upon the Plank or Board. The other Parts of this Case seeming to be very obvious from the Figure, we shall, for Brevity, omit any Explanation of them, and only observe that its Size is to agree with that of the Limb. But by reason of the vast Numbers of Fractures which happen in a War, and the great Scarcity and Cumberfomeness of these Machines at such Times, the Camp Surgeons are generally obliged to substitute Cases of Straw in the room of them. At every Dressing of the Limb, if *PETIT's* Machine be used, the Hooks *EE* are to be undone, and the three Sides opened: But when the Wound and Fracture are dressed and bound up, the Foot must be exactly placed and the Case fastened as before.

Fractures of
the Bones of
the Feet.

IV. Lastly, the Bones of the Foot, which compose the *Tarsus*, *Metatarsus*, and Toes, are equally liable to Fractures in the same Way with those of the Hands: But by reason of the great Complication of Nerves, Tendons, Ligaments, and Membranes, Fractures in this Part are usually attended with Wounds and the worst of Symptoms, as Inflammations and Gangrenes. The Bones are to be replaced, and the Cure carried on much in the same Manner also; except the Difference of Bandage, which we shall explain when we come to the particular Doctrine of them^b: This we may also observe in the general, that Fractures of the Feet, like those in the Hands and Ankles, can seldom be so

^a Tho' it is a great Pity that the Author has not there subjoined a particular Explication of his Figures by annexed Letters or Numbers; because it is probable that some Parts will not be rightly understood by many.

^b See *LE DRAN's Chirurgical Observations*, 108.

perfectly cured as to leave no Stiffness nor Want of Motion behind, if they should escape the Company of an Ulcer, *Caries*, or incurable *Fistula*. Which last bad Symptoms are often to be remedied by no Means but that of amputating the Member, nor will even that always preserve the Patient from Death; and the injured Part should be carefully guarded against Inflammations and Gangrenes, by proper Medicines; particularly, Fomentations of Lime-water and Spirit of Wine camphorated: Nor should you by any means omit Bleeding and the additional Application of internal Remedies. 'Tis one's Interest, therefore, in violent Fractures and Contusions of this Part, to give timely Intimation of the Danger to the Patient, or at least to his Friends: Lest the miserable Condition of the Patient should be afterwards rashly attributed to some Misconduct in the Surgeon, as they too often are. But if any body be desirous of a larger Acquaintance with Fractures of the Bones, I must recommend to him the diligent Perusal of the celebrated PETIT's Treatise on *Diseases of the Bones*.

C H A P. XI.

Of Bones broken by sharp pointed Instruments, which may be termed
WOUNDS of the BONES.

I. **H**ITHERTO we have been treating of Fractures of the Bones, occasioned by blunt Instruments. It remains now that we consider such as are produced by sharp ones, as Darts, Swords, Spears, &c. which may not improperly be called Wounds of the Bones; for which Reason few Writers have treated of them separately. For these Weapons do not only cut asunder and separate the soft and fleshy Parts, but do also the same to the hard Bones, which they divide sometimes slightly, sometimes greatly, and often they make a Solution equal to a Fracture: But these Wounds cannot be inflicted upon the Bones without being attended with a great Variety of Symptoms, which are often very grievous, according to the Size and Depth of the Wound, the Nature of the Part, and the Force with which it was inflicted; as whether the Violence be received in the Head, Nose, Jaws, Fingers, Hands, Arms, Shoulders, Legs, or Thighs. As therefore the Knowledge of these Accidents is of great Importance, and as they require a somewhat different Method of Treatment from other Fractures, it was here proper to say something in particular of the best Method to be taken for their Cure.

Wounds of
the Bones.

II. But before we proceed to the Method of Cure, it must be first observed, that such slight Wounds as do not penetrate deep into the Bone, are generally not so very dangerous: Especially if we proceed regularly in the Cure, keeping the Bone covered, as much as possible with its Integuments from the Action of the Air, and wholly reject the Use of fat or oily Medicines, as very prejudicial to the Bones. But when they penetrate deep, wholly divide the Bone and its adjacent Parts, or violently affect any Organ more directly necessary to Life, in the Head, Neck, *Spina Dorsi*, and Breast, with a Puncture or Division of the larger Veins, Arteries, Nerves, and Tendons of the upper or lower Limbs: The Danger is then much greater, and the Cure more difficult, Death being often the Consequence.

Their
Prognosis.

X

III. In

The Method
of Cure.

III. In the Cure of these Fractures by sharp Instruments, PETIT inadvertently advises, in his Treatise on *Diseases of the Bones*, though in other Respects a very good Surgeon, "That in this Kind of Accidents in the Bones, if the Solution be inflicted lengthways, the Lips of the Wound are to be closed together, and cured with the uniting Bandage; but such as are inflicted very obliquely, or wholly transversely, are to be joined together by Suture and the Bandage that has eighteen Heads." But as this Method is unsuccessful in many Wounds of this Kind, and so might lead young Practitioners out of the Way, it will not be improper here to expound this Matter more fully, and set it in a clearer Light. Indeed in the first Kind of these Wounds I do almost agree with him; especially when they are slight, as when the Skull is not wholly nor deeply penetrated, and without Contusion, nor the Brain much hurt, as we have observed in Wounds of the Head, *Chap. XIV. N. II.* But when the contrary of these obtains, we must proceed more cautiously, and in a Method very different, keeping the Wound open with Lint, cleansing it, and when cleansed, healing it with Balsams, as we have observed in treating of Wounds. For by a too speedy Closure of such Wounds, the most violent Symptoms, and often Death itself, have been frequently brought on. So also in the slighter Wounds of this Kind, which are inflicted obliquely or transversely, I do not approve, with PETIT, of using promiscuously the Suture and eighteen-headed Bandage: But on the contrary, instead of a general Use, I think them the most seldom necessary. For I have seen cured by others, and have often cured myself, many of those Wounds in the Bones without the Use of that Bandage or Suture. To make the Thing more apparent by Example; in oblique Wounds of the Head, Forehead, and *Cranium*, which are none of the violent Kind, the Parts may be retained and closed much easier by a Plaster and common Bandage, than by Sutures made with Needles and Thread, as PETIT seems here to direct; and still much less occasion is there for the Bandage with eighteen Heads. But as I have said in the Chapter of *Wounds in the Head*, these are generally more easy to cure by agglutinative Powders, Balsams, and Plasters, whether the Bones wounded be the Jaws, Clavicles, Shoulder-blades, or in the upper or lower Extremities. But when the divided Part hangs down, so as not to be kept rightly rejoined to its Opposite by these Means, the Suture then seems altogether necessary.

Wounds of
the Finger
Bones.

IV. If the Bones of the Fingers should be thus wounded, or wholly divided by a Sword, so as only to hang by the Skin and Flesh; I have happily cured them, without the Suture and eighteen-headed Bandage, in the following Manner: I first accurately replaced the divided Bone, and retained them joined together in that Posture by winding round a Slip of Plaster, then applied a Compress dipped in *Sp. Vin.* laying over little Splints of Paste-board for the Retention of the broken Bones in their right and natural Posture; and, lastly, I bound up the whole firm with a proper, long, and narrow Bandage, suspending the Hand in a Sling, hung about the Neck for that Purpose. This I left so for several Days, ordering nothing more than for the Patient to keep up to a proper Diet and Rest. At length I carefully undid the Bandage, and tenderly removed the Compress, but not the Plaster, still supporting the Finger in its right Situation; and after cleansing the Wound as well as it would admit, I dropped in some vulnerary Essence, and applying a fresh Compress dipped in

Sp.

Sp. Vin. bound it up again as before. Thus it was again left for several Days more, and in about every three Days it was dressed in the same Method, till after the Space of about a Month it was quite firm and well.

V. If either of the Bones of the *Cubitus* is divided, it generally happens to be the *Ulna*, that being most exposed to the Weapon in fighting; nor does it then require either the forementioned Suture or the Bandage: But the Wound being cleansed, is to be treated with some vulnerary Essence or Balsam, and with Lint dipped in the same Essence; after which, are to be laid on in order the Plaster, Compress, and Paste-board Splints wetted with *Sp. Vin.* which are to be bound round the thick Part of the *Cubitus* near the Wound with a long Bandage, that, as they dry they may accommodate themselves the better to the Figure of the Part: And lastly, the Arm is to be suspended in a Sling hung as usual about the Neck. And thus dressing the Wound every other Day, or, in Proportion to the Discharge, every Day, a Cure may be brought about without any Suture, which I here judge to be pernicious. But when either of the Bones of the Leg are broke, I do then indeed use the Bandage with eighteen Heads, as in other Fractures of the Leg and Thigh; but scarce ever the Suture: Because there is seldom or never occasion for it in Fractures of the *Tibia* alone, which is covered with scarce any thing more than the Skin: And it is extremely rare that it is required in Fractures of the *Fibula*, unless some of its large Muscles are divided. For we should refrain from the Use of Sutures as much as possible, because they generally excite Inflammation, Pain, Convulsion, and other bad Symptoms; so that we cannot approve of their Use, but in the greatest Necessity where we perceive the Cure of the Wound cannot be effected without.

Wounds of
the Arm
and Leg
Bones.

VI. If the Thigh Bone should be cut by a Sword, then the better to close and retain those strong Muscles, a Suture made with Needles and Thread, as in some other Wounds (*Book I. Chap. I. § XXXIII and XXXIV.*) will certainly be of Service: The Wound is to be treated in the Method we have there taught, bound up with the eighteen-headed Bandage, and the Limb is to be placed carefully in a Case of Straw, as in other Fractures. So also if the Bone of the *Humerus* or Arm should be penetrated by a Sword, it should, for the same Reason, be treated with the Suture as before; yet not dressed with the eighteen-headed Bandage, but a long and narrow one, as in other Fractures of the Arm. The Arm is afterwards to be supported by a short Napkin, fastened about the Neck; by which Means the Muscles will be brought to a more ready Union, and the Cure sooner and easier perfected. When we find the fleshy Parts are united, the Threads must be cut, and drawn out, as in other Sutures: For the rest, we proceed, as in all other Fractures of this Kind.

Wounds in
the Arm and
Thigh Bone.

VII. If it should at any time happen that both the Bones of the *Cubitus* or *Crus* are divided, so as to leave the Member hanging only by the Flesh, Skin, and Blood-vessels, (which is an Accident that very rarely happens without wholly amputating the Limb) then also the Suture with the eighteen-headed Bandage is to be applied. But the Suture can be of no Service when the Part is wholly or so far cut off as to hang by the Skin, its Nerves and Blood-vessels being divided; especially when the Part is so considerable as the Leg or Arm. For in that Case it is much the best to take the Limb quite off, to stop the

Of both the
Bones of the
Cubitus and
Leg divided
together.

Wounds of
the Jaw-
Bone, Cla-
vicles, and
Scapulae.

violent Hæmorrhage of the Vessels, as in other Amputations, and to dress the Member in the same Manner.

VIII. When the lower Jaw is so cut by a Sword, that the Piece separates much, and cannot be otherwise properly retained, then also the Suture must be brought into Use; adding a proper Balsam, Plaster, Compress, and suitable Bandage. If the Clavicle, or *Acromium Scapulae*, should be in like Manner wounded by some sharp Instrument, the Treatment and Bandage are to be performed in much the same Manner; gently unbinding, cleansing, and dressing every other, or every Day, as we have observed in the rest of these Accidents, till the Cure is perfected.

IX. The Hæmorrhage, which in these Injuries is often very large, must be stopped by Compresses, Astringents, or Ligature upon the Vessels, according as which may seem most suitable to the Case. Gun-shot Wounds of the Bones are to be treated in the same Manner; or like Fractures. See further on this Subject, Ch. III. of *Gun-shot Wounds*; and in my Treatise of *Wounds of the Bones*.

AN EXPLANATION of the NINTH TABLE.

Tab. IX.

Fig. 1. Is a Compress folded together by Degrees, called by the *French Compressse graduée*, to be applied in Fractures of the Thigh, to make its small Part towards the Knee of the same Thickness with its other, that the Splints may act more equally upon it by the Bandage.

Fig. 2. Is two lunar Plasters, to include and hold firm the fractured Knee-pan after it has been set.

Fig. 3. A perforated Plaster for the same Use.

Fig. 4. Is a Fracture of the Leg, with an external Wound A, to be bound up with the Bandage of eighteen Heads BBBB; which commodious Kind of Bandage seems to have been unknown to the Antients.

Fig. 5. a Straw Couch or Case for a broken Thigh, called by the *French Fanons*, the Letters AAAA denote two Sticks covered with Straw, bound on with strong Packthread: To both Sides of these is also fastened a strong Cloth BB, of about two Feet broad, and three long. This Couch is usually made twice the length of the Thigh, so as to reach from the Groin and *Os Ilium* to the End of the Foot.

Fig. 6. Is a Sole of thick Paste-board or Wood, fitted to the Size of the Patient's Foot: It is to be applied to the Bottom of the fractured Foot, and bound on by the three Tapes a a a, to retain or stay the Foot in its proper Posture; whence *CELSUS* calls it *Mora*.

Fig. 7. Is a quilted Compress to be applied between the Foot and the Stay, to be soft, and defend it from any rough Action of Paste-board or Wood.

Fig. 8. Is a soft Linen Ring joined to the foregoing Compress, to let in and hold the Heel: It is to be fastened to the Foot by the two Tapes b b.

Fig. 9. Is a Brass Trunk for securely retaining a broken Leg: It consists of three Parts ABC, which are joined by the Hinges 1, 2, 3, 4, 5, 6. The Middle Part B is the Basis or Chief of the Machine, which, like an hollow Pipe, receives the bound-up Limb: The outer Parts A and C are as moveable Lids or

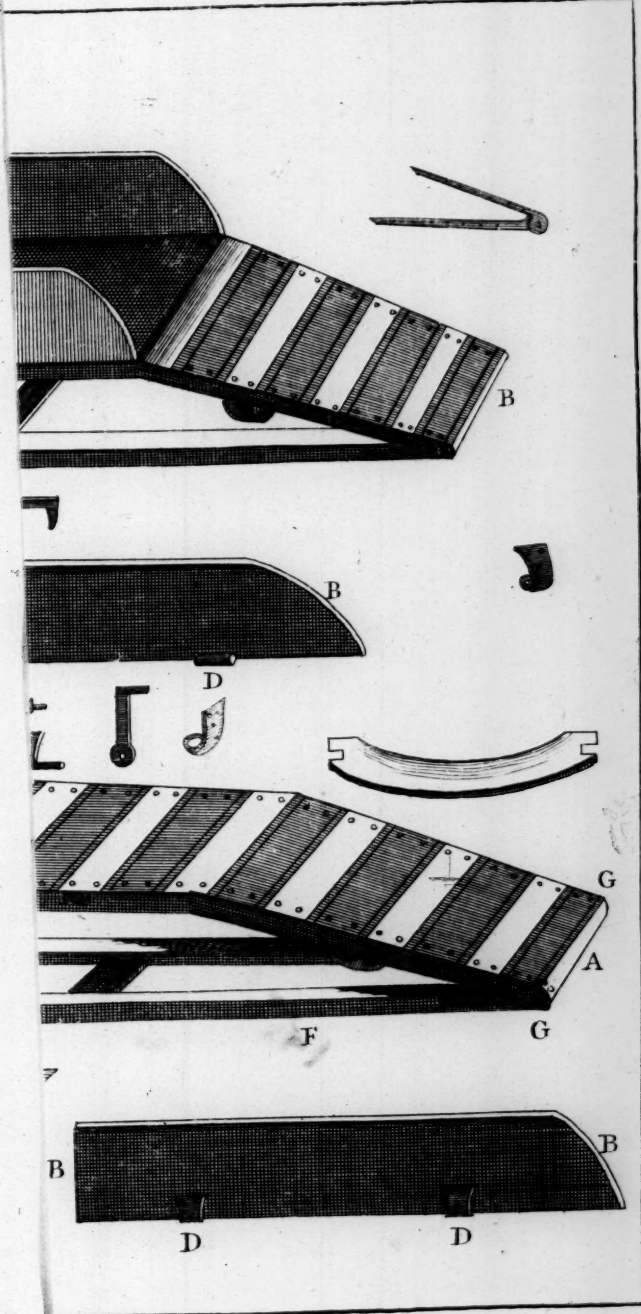


Fig. 1.

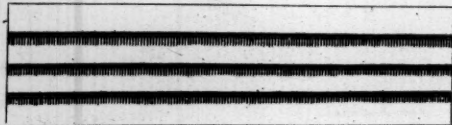


Fig. 2.



Fig. 3.



Fig. 4.

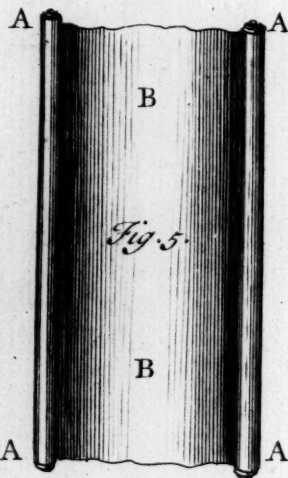
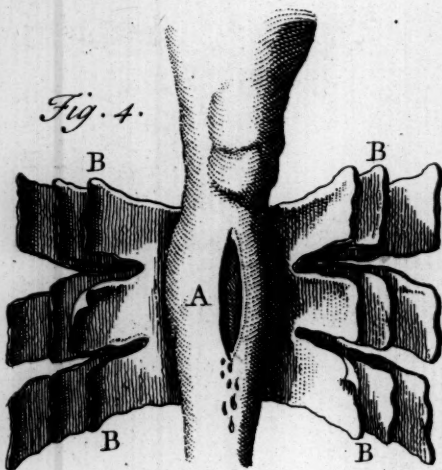


Fig. 5.

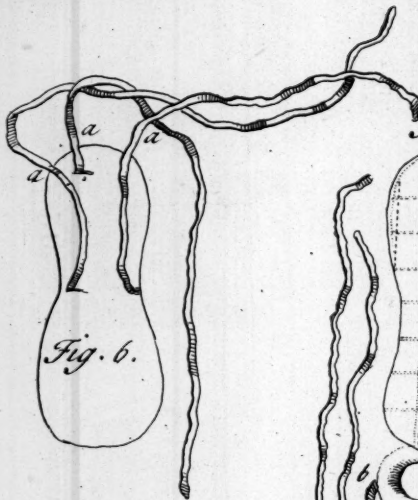
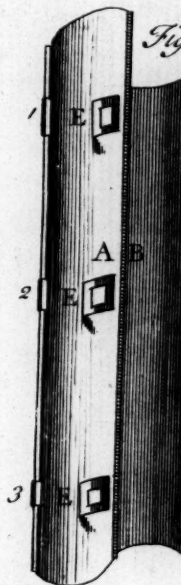


Fig. 7.

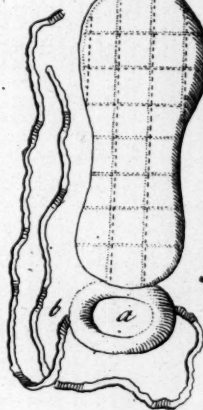


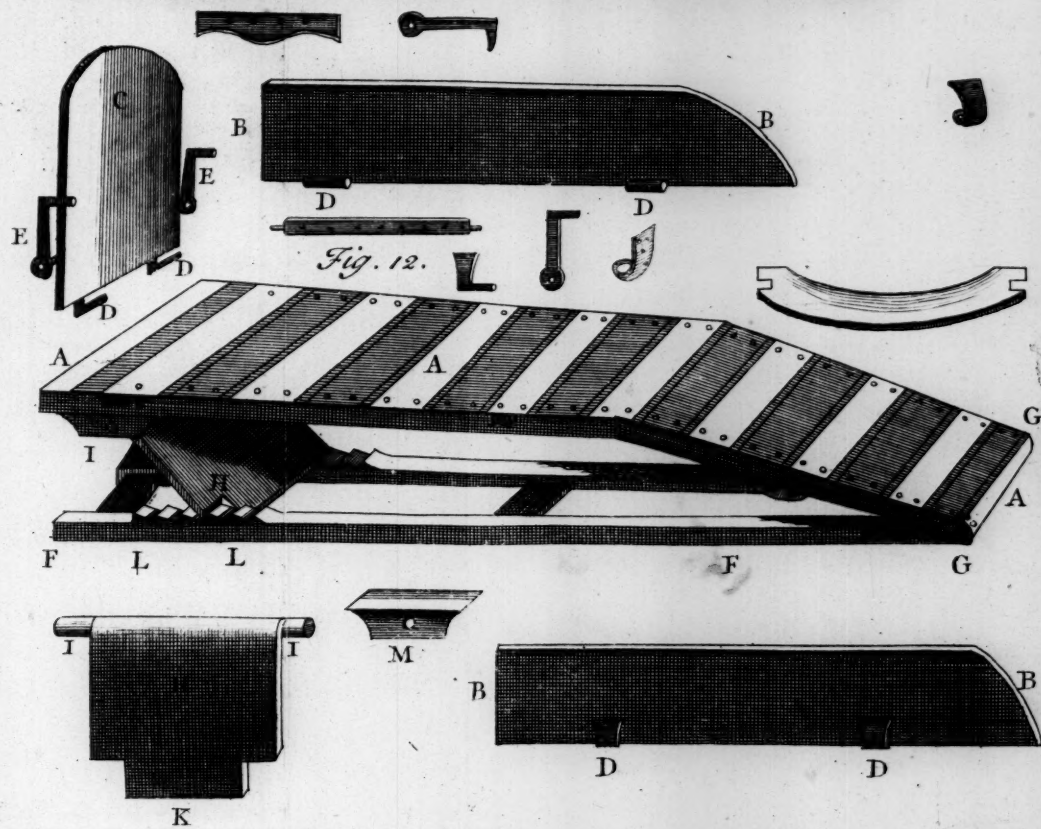
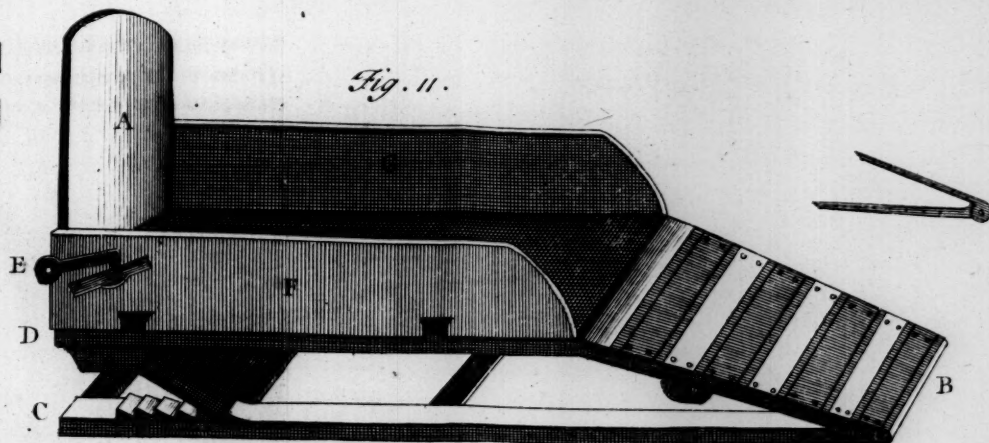
Fig. 8.

Fig. 13.



Fig. 10.





Wou
the
Bone
vicie
Scap

Tab.

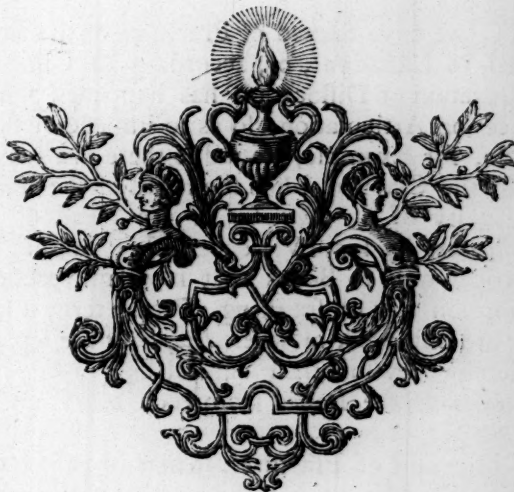
or Wings, which may be turned back or folded together: To each of these Lids AC, are joined three almost square Loops EEE, through which are passed Tapes to draw them tight together, and keep them firm upon the fractured Leg. Its Size must agree with the Leg.

Fig. 10. Is a wooden Arch to put over a broken Leg, to keep it from being disturbed by the Bed-cloths, &c.

Fig. 11. Is PETIT's new Machine Case, (in *French Boette*) or a Box, for retaining a broken Leg, after it has been set and dressed as usual, It is described fully at Chap. X. § III. of *Fractures*.

Fig. 12. Is the same in Pieces, to shew its Structure the better. The Letter M denotes the perforated Bracket, which receives the wooden Axle or Hinge II, that it may be elevated or depressed. The rest are sufficiently explained above at Chap. X. § III.

Fig. 13. Is a Compress folded at one End, to fill up the Small of the Leg, that the Splints may compress the more equally and firmly.



INSTITUTIONS OF SURGERY.

PART I. BOOK III.

CONCERNING LUXATIONS, or LUXATED BONES.

CHAP. I.

Of LUXATIONS of the BONES in general.

What a
Luxation is.

I. **H**ITHERTO we have treated of Fractures of the Bones. We shall now proceed to Luxations, or, according to CELSUS, Dislocations. We say a Luxation or Dislocation has happened when any Bone is moved out of its Place or Articulation, so as to impede or destroy its proper Motion and Office. So, for Example, we judge there is a Luxation when the *Acromion* is loosed from the Clavicle, when the Head of the *Humerus* is slipped out of the glenoeide Cavity of the *Scapula*, or the Head of the Thigh-bone pushed out of its *Acetabulum* by some Violence, &c. So that it hence appears that Luxations are proper only to Bones that have moveable Joints or Articulations; but in a common way of speaking, People term it a Luxation when the Bones of the Nose are displaced, or when *Epiphyses* are separated from their Bones in Infants, whereby they lose their natural Use. And, indeed, CELSUS has ranked these Recesses of the Bones from each other under the Class of Luxations.

What is re-
quired previ-
ous to their
Discovery
and Cure.

II. From what has been said of Fractures, it may be easily concluded what is necessary to be done by those who desire to be happily versed in the Knowledge and Cure of Dislocations. First, that they should have a clear Idea and Remembrance of the Form of each Articulation, with their Ligaments and Muscles: Which may be in some Measure obtained from accurate Figures in Anatomical Books, but rather from a frequent and diligent Inspection of the Skeleton and recent Bodies. For the Ligaments and Cartilages which are absent in the bare Skeleton, may be fully observed, in their natural State, in a recent Subject.

III. Luxations

III. Luxations are generally distinguished by Physicians into *Perfect*, and *Imperfect*. The imperfect consists chiefly in this, that the Bones are here dislocated or removed out of their Places but in part, yet so as that they cannot perform their Office. Some are for distinguishing this Kind of Injury by the Name of *Subluxation* or *Distortion*. But the perfect Luxation is, when moveable Bones are wholly separated or displaced from their Articulation with each other: As when the *Humerus* or Thigh-bone is removed quite out of its Socket. In both these Kinds of Luxations the Bone may slip out in several Directions; as externally or internally, behind or before, and above or below. Another considerable Division of Luxations, is, into *Simple* or *Compound*: The latter when besides the Dislocation there is some other bad Symptom, as a Wound, Fracture, Weakness or Straining of the Ligaments, Contusions, violent Inflammation, or the like: But in the first there are none of these. The last Division of these Injuries is into *Recent*, or just inflicted, and *Inveterate*, or of some standing. The more free and moveable the Bone is in its Articulation, the more subject and easy to be dislocated.—So that it is no wonder if the Bones of the Arm are oftner displaced from their Articulations with the *Scapula* than those of the *Cubitus* and *Wrist*, and the *Vertebrae* of the Neck and Loins oftner than those of the Back.

Of the several Kinds of Luxations.

IV. What we have been saying is in common to all Dislocations. But it remains that we describe every particular Kind of Luxation, beginning with the Head. We may suppose the Head to be luxated when (1.) the Bones of the Nose gape; or (2.) when the lower Jaw stands in or out further than the upper; but it cannot be easily shoved out backward, because hindered by a Protuberance of the *Os Petrosum*; or (3.) when the Head with the *Vertebrae* of the Neck are distorted to one Side, as it may have been sometimes observed by the Surgeon; or, lastly, (4.) when the Bones of the *Cranium* are forced apart by violent Pains, Fever, or Dropsy in this Part.

Luxation of the Head.

V. Tho' all the *Vertebrae* which compose the Spine have a proper Motion, they are none of them easily removed wholly out of their Places, so as to make a perfect Luxation. But the *Vertebrae* of the Neck are much easier displaced than the rest, because smaller and more moveable; tho' these are generally connected very closely and strongly to each other and the larger *Vertebrae*. So also the *Vertebrae* of the Loins are extremely difficult to dislocate, tho' more moveable than those of the Back, being separated by thicker Cartilages, and without Sinuses. Lastly, the *Os Coccygis* may be shoved outwards in hard Births, and is sometimes displaced and bent inward by a Fall or the Force of some other hard Body: By which means it presses on the *Rectum*, and very bad Symptoms follow.

Luxation in the Spine.

VI. As the Breast is made up of various Bones, so it is also subject to various Luxations. Thus the Ribs may by some violent Blow or Fall be shoved from their Articulation with the *Vertebrae* into the *Thorax*, to the great Damage of the Breast and Lungs. Sometimes it happens that the ensiform Cartilage, at the Bottom of the *Sternum*, is depressed or thrust inward by some Violence, so as to greatly afflict the Stomach*. The Clavicles are also sometimes dislocated

Luxations of the Breast.

* See CODRONCHIUS, of Diseases reigning at Imola, &c. An. 1602. and a new Distemper, called, The Depression of the ensiform Cartilage. Bonon. 1603.

at one or both their articulated Heads, those joined to the *Sternum*, and those to the *Scapulae*, but mostly the first: Which, whenever it happens, the Arm hangs down unsupported, and its Motion obstructed.

Luxation of
the *Humerus*.

VII. If any one Bone is to be easily dislocated, it is that of the *Humerus*, partly because its Head is not lodged in any deep *Sinus*, and partly from its very ample and free Motion. It may be forced out either before, behind, or downwards; but never upwards, without breaking the *Acromion* or coracoide Process; for these confine down the Head of the *Humerus* very firmly above. Though the *Cubitus* does, at times, undergo various Luxations, it can seldom happen unless the Violence be great: And then it usually suffers only an imperfect Luxation; from the Shortness of the Ligaments, the Deepness of the Articulation, and its external as well as internal Defence with Ligaments. For the *Cubitus* to be luxated forwards is hardly ever the Case, being prevented by the Protuberance, *Olecranon*: But then it easily and frequently slips out backwards; as from duly considering the Articulation will be very apparent.

Luxation of
the *Cubitus*.

Luxation of
the Hand.

VIII. The Wrist is very seldom dislocated from the Bones of the *Cubitus*, and hardly ever suffers more than an imperfect Luxation, from the Shortness and Strength of its Ligaments. But if it should be luxated, it will much easier slip out backward and forward, than inward and outward. The Reason of which is not difficult: For there is a bony Process on each Side the *Carpus*, where it is articulated to the *Radius* and *Ulna*, which defends it from being easily displaced. Sometimes the small Bones of the *Carpus* are subluxated among themselves, whence generally arises an Extension and Stiffness in the Hand. In like Manner may the Bones of the Fingers be displaced; but then they are more easily reduced and cured.

Luxation of
the Thigh.

IX. Among Luxations of the lower Extremities, that of the Thigh-bone comes first to be considered. The Head of the Thigh-bone may be forced out either upwards, downwards, forwards, or backwards: But which of these Ways it happens to be displaced, may be determined generally from the Touch, and from the different Direction and Length of the Limb. What we have before taken Notice of (*Book II. Chap. VIII. N. VI.*) is also here worth fresh Observation; viz. that the Head of this Bone is not near so often pushed out of the *Acetabulum* by some external Violence, especially in grown Persons, as is commonly suspected. For the modern Surgeons, contrary to their strong Opinion of a Luxation, have generally found a Fracture in the Neck of the Thigh-bone. Nor is this to be wondered at: Since the Head of this Bone is articulated into so deep a Socket, and secured by such strong Ligaments, that it cannot be dislocated in a dead Subject by the strongest Man or other Violence. Whereas, on the contrary, the Neck of this Bone is found to be very small, infirm, and brittle: So that it will be much easier for the Neck thereof to be broken, than its large Head to be forced out of its Socket. The Reason why this Fracture has been so commonly taken for, and treated as a Luxation, seems to be owing to the close Concealment of this Part by so many thick Muscles; and on that Account the *Trochanter Major* has been frequently mistaken for the Head of the Thigh-bone.

A Luxation
of the Thigh-
bone usually
happens
from an in-
ternal Cause.

X. From what has been said, we may perceive the Reason why the antient Surgeons had generally such bad Success in reducing this their supposed Luxation, scarce ever making a Cure without laming the Patient: To say nothing of

of the Torture and bad Consequences of their improper Extensions by Machines. They thought their not being able to reduce these Luxations, was, because they could not make an Extension strong enough to overcome the robust Muscles of this Part: Upon which Account, they invented all Sorts of Pullies and strong drawing Machines, whereby they might extend and draw with the greatest Force: Figures of which may be seen in SCULTETUS's *Armamentarium*. But as the Bone was not dislocated, but fractured, all the good they did the Patient was little else than exciting violent Pain, Convulsion, Inflammation, Abscess, and other grievous Symptoms. For nothing is more certain than that a true Luxation of this Bone from external Violence, was scarce ever at the Bottom of any of their Cases, which they, as some now do, suspected to be such: For it is scarce possible the Head of this Bone should slip out of its Socket; unless some great Weakness or Relaxation of its Ligaments, and a Congestion of morbid Humours between the Joint has happened some Time before, by which Means this otherwise very strong Ligament may, by degrees, be so elongated and relaxed, as easily to give way to some future external Force, which is observed to happen in Children rather than Adults. In these young Patients the Head of the Thigh-bone generally falls inwards toward the great Aperture of the *Os Pubis*, and can seldom be replaced: It most commonly adheres to that Bone; and the Children who labour under this Complaint, if properly supported by strengthening Medicines, are yet able to walk, though not without limping.

XI. A Dislocation of the Knee-pan is seldom discoverable by an unskilful Surgeon, especially when the Motion of the Bone, from its natural Seat, is very easy and large. For if he be destitute of anatomical Skill in the Joint, there is great Danger of his treating it for a Dislocation of the Knee, tormenting the Patient with Pain from an useless Extension. But such as have before duly considered the natural Disposition of these Bones, will readily perceive whether the Dislocation be of the *Patella*, or of the Knee: For the Knee-pan is always pushed either without or within-side the Joint. But for the Knee itself, though the Head of the *Tibia* may be forced on either Side that of the Thigh-bone; yet, as the Articulation is very broad and grooved, being defended and held fast by exceeding strong Ligaments, it never happens to be perfectly luxated.

Luxation of
the *Patella*
and Knee.

XII. The Foot, indeed, is not exempt from being pushed out before or behind from the *Sinus* of the *Tibia*: But it cannot be dislocated on either Side, because prevented by the two Heads of the Bones which form the Ankle, unless they should chance to be broke at the same Time. The lower Head of the *Tibia* may be sometimes separated by a great Force from that of the *Fibula*, and the Foot may at the same Time be dislocated outwards, as we read in some Observations. CELSUS has treated of this Species of Luxation, *Book VIII. Cap. 11*. The Bones of the *Tarsus* are connected to each other by very strong Ligaments, and so cannot be easily dislocated: But they are sometimes so violently strained, as to occasion most sharp Pain, Convulsion, and *Sphacelus*, unless prevented by timely Assistance. Lastly, the Toes are seldom luxated; but if they should, they must be treated like the Fingers.

Luxation of
the Foot.

XIII. The *Causes* of Luxations are either external or internal. The *external* are Falls, Blows, Leaps, Strugglings, and such like. The *internal* are preternatural Congestions in the Articulations: As when morbid Humours gather and

The Causes
of Luxations.

relax the Ligaments, so as to make the Joint dislocate of itself, or by a Force not much greater, as rising up, walking, leaping, &c. a sad Instance whereof, I saw in a Student at *Altorf*. And another Instance of the same Kind I remember in the Manager of a considerable Farm, who frequently dislocated his Shoulder-bone from a very slight Motion of his Arm. The weaker Men are; the more subject to this Sort of Luxation. Hence it is that the Bones in the Limbs of Infants are so easily distorted, and wholly separated from their *Epiphyses*, upon a Fall, or rough handling. It is also worth observing, that ZWINGER (*Theat. Pract. II. pag. 109.*) knew a lame Woman that bore three lame Sons.

The Signs of Luxations.

XIV. Many and various are the Signs of Luxations of the Bones: As from (1.) The want of Motion in the Joint. (2.) The Change of Figure or natural Posture of the Limb. (3.) An unusual Hollowness or Protuberance, there being always a Tumor on that Side where the Bone is out, and a Cavity on the other where it came from. (4.) From the Difference of Length in the Limb, which is usually shorter when the Bone is dislocated upwards, and longer, when downwards; or lastly, (5.) from the Pains excited by the violent Distortion of the Ligaments. For unless the Dislocation be speedily and rightly reduced, it is scarce possible but there must follow violent Convulsions, Inflammations, *Sphacelus*, and Death itself, merely from the vehement Distention of the Ligaments. But when the Bone is gradually thrust out of its Place from internal Causes, then there is scarce any Uneasiness perceived. In the mean time, to make a more ready Discovery of Dislocations in general, it may be very proper to have in Readiness an universal Rule; viz. *That whenever the Head of any Bone is removed out of its Place, its other End will be distorted in an opposite Direction: When the upper End of a Bone is thrust inward, its lower one will stand outwards, and when the first is outwards, the latter will be bent inwards.*

The Signs proper to particular Luxations.

XV. Tho' these common Signs of Luxations, with a Knowledge in the Mode of each Articulation, may be generally sufficient to discover most Dislocations: (as, for Instance, where there is a Luxation, you will feel a Cavity and a *Sinus* by pressing your Finger upon the Place; and, unless it be soon reduced, a Swelling and Inflammation will ensue) Yet we ought not to be ignorant of several other Signs which are proper to some Luxations only. Thus in a Dislocation of the lower Jaw, the Mouth gapes open and cannot be shut by the Patient. When one *Vertebra* is pushed over another, all the Parts beneath it are deprived of Sense and Motion: For none of the *Vertebrae* can be dislocated in any manner, without compressing or wounding the *Medulla*, which is transmitted through their Middle, in Consequence of which, the Course of the Spirits through it and its Nerves to the lower Parts, will be either disturbed or wholly intercepted. When one of the Ribs is dislocated, the Breath is very difficult to be drawn, and other bad Symptoms of the like Kind arise. But to open at large the peculiar Signs of every other Luxation, is not the Business of this Place: Especially as they may be readily deduced from the Action of each particular Part where they happen.

Signs of imperfect Luxations.

XVI. A Subluxation or Strain may be discovered, when the Patient has suffered under some great external Violence, and the particular Joint is afflicted with Immobility and violent Pains, the natural Figure or Position of the same being little or nothing changed. But however, upon a more strict Examination

tion of the Part affected, there may be almost always found some little Inequality in the Articulation or Limb.

XVII. Lastly, Luxations which proceed from internal Causes may be known from the following evident Signs: (1.) The Limb is so much relaxed as to be easily turned about in any Direction. (2.) There will be a Cavity about the Place of the Articulation, and the Fingers will perceive a Hollowness upon pressing them between the Bones, and a preternatural Swelling will appear in another Place. (3.) The Bone that has slipped out may be easily replaced, but then it soon falls out again of itself; so great is the Weakness of the Ligaments and Muscles, that they are not able to keep the Bone in its right Place. Hence, (4.) the dislocated Limb will be longer than the sound one. It is also (5.) generally not accompanied with any Pain, Inflammation, or Convulsion, as is usual in other Luxations. Lastly, (6.) from the Seat of this Luxation, being generally in the upper Joint of the Thigh or Arm, and sometimes in the Articulation of the Foot with the *Tibia*.

Signs of
Luxations
from internal
Causes.

XVIII. If any Surgeon desires to be well skilled in the *Diagnosis* and *Prognosis* of Luxations, I advise him to be well versed in the Structure and Difference of the Parts affected, as well as to compare the Case carefully with the several Causes and other Circumstances of Luxations. For thus we find that *imperfect* and *simple* Luxations are reduced with much more Ease, and treated with much greater Success, than such as are attended with Wounds, Fractures, Convulsions, Inflammations, or the like. The Reduction is not only more difficult in Proportion to the Number of Accidents or Symptoms, but also as the Bones are more or less distant and separated from each other: Insomuch, that the Bones cannot often be replaced, by reason of the Fracture and great Inflammation; or, if they are once reduced, it is very difficult to retain them in their Places, and perfect the Cure without Lameness, from the great Weakness of the Ligaments: Which last is usually the more certain in Luxations from internal Causes. But in Luxations that happen from internal Causes in very young Subjects, the lower Part of the Limb generally wastes, and becomes altogether weak and flaccid. Luxations that have just happened, are in the general much easier and sooner cured than those of long standing: For in the latter there generally arises a Tumor with Inflammation, and the Juices gather in great Quantity, by which Means the Ligaments are extremely relaxed, or the Articulation so glewed up and obstructed, that it cannot receive the Head of the Bone as before. Nor is it unusual for the Head of the dislocated Bone, in an inveterate Luxation, to lodge itself in some new *Sinus*, on one Side its natural one; by which Means the Head of the Thigh-bone has adhered and grown to the external Part of those of the Hips, or else to its *Acetabulum*; that Cavity itself being filled up with some preternatural and tenacious Juice. It may be observed in general, that Luxations are very seldom mortal, except in the Head, and in the *Vertebra*.

The Prognosis of
Luxations.

XIX. If any Bone be dislocated in Infants, or separated from some *Epiphysis*, the Case is very dangerous, and usually attended with very bad Consequences. For (1.) the Head of the very soft and cartilaginous Bone is so distorted as to be seldom if ever reducible to its natural Figure. (2.) These Kinds of Luxations are usually concealed by Maids and Nurses, so that they do not come under the Care of the Parents or Surgeon, till it is too late. (3.) The Case of Infants

Luxations in
Infants.

rarely admits of a regular Extension and Reduction of the Part, from the Extremity of Pain, which they are incapable of bearing. (4.) When the Luxation in younger Patients has been of any standing, the Head of the Bone is so enlarged, and the *Sinus* or Socket so contracted, that it is often impossible to render it. (5.) It may happen that the Surgeon, ignorant of the true Cause, will take it to be and treat it as proceeding from a Flux or Humors, often too violently extending those soft and now cartilaginous Parts, and throwing them into some very bad Posture. Lastly, (6.) want of Skill in the Surgeon may be an Occasion of the Bones not being happily replaced in Infants: For nothing is more improper than the violent Distension some Surgeons use in these Cases, whereby they separate those soft Bones and their *Epiphyfes* more from each other, and occasion many bad Symptoms.

If attended
with a
Wound.

XX. Dislocations attended with a Wound, especially of the Shoulder or Thigh-bone, are of very bad Consequence, and often endanger the Life of the Patient; in *CELSUS's Opinion*, Book VIII. Chap. 25. whether the Bones be replaced or not, there is generally great Danger; and so much the more, the nearer the Wound is to the Joint. *HIPPOCRATES* has declared that no Bones can be reduced with Security, beside those of the Hands and Feet. *Vesliar.* 19. 5.—See more on this Subject, in that Passage of *CELSUS* just now quoted: Though I by no Means recommend the following him implicitly.

CHAP. II.

Concerning the CURE of LUXATED BONES.

The Cure of
Luxations.

I. **T**HE Method of treating Luxations of the Bones does pretty much agree with, and is in a great Measure the same with, that used in Fractures. For in Dislocations, as in Fractures, the whole Design of the Surgeon is, (1.) To restore the luxated Bone to its Place, first by Extension, and then by Reduction with his Hands. (2.) to preserve and retain what is so replaced in their natural Position. And lastly, (3.) To prevent and cure the several Symptoms which usually attend. The Reduction is used to be commodiously performed by placing the Patient on a Stool, Table, Bed, or the Ground, as the Surgeon shall think most suitable to the Case. It is however to be observed here, that those Luxations are most readily reduced on a Stool, which happen in the Jaw, Clavicle, Arm, or Hand: On a Table, such as happen in the *Vertebrae* or Thighs: On a Bed, such as happen in the Legs or Feet: And lastly, those Dislocations are most commodiously reduced on the Floor which happen on the Shoulders or *Vertebrae* of the Neck.

Of (1.) the
Extension.

II. The Extension, as we observed, in dislocated Bones, is to be made much after the same Manner as in Fractures: *viz.* the outer or lower Part of the dislocated Limb is to be extended by an Assistant, till the Head of the disordered Bone be found to correspond exactly with the *Sinus* from whence it was luxated. This may be done by the Hands, but if they are not so convenient, the Extension seldom fails of being made so well by a Napkin, as to render the Machinery delineated in such an ample Manner by *ORIBASIUS*, *PAREY*, *ANDREAS A*

CRUCE,

CRUCE, SCULTETUS, and others, generally unnecessary : Since they can effect scarce any thing more, unless it be to terrify and discourage the Patient in the Extension, by their formidable Shew.

III. To replace the luxated Bone again in its natural Seat, the Surgeon must regulate the Assistant's Extension, by ordering it to be strong enough, and in a right Direction ; in the mean Time he is to compress the Articulation gently with his Hands and Fingers, till he find the elaps'd Bone recover its right Place.

Of (2.) the Reduction.

IV. An accurate Reduction of a Luxation is known to have been effected by the same Signs which have been beforementioned in the Doctrine of Fractures. It is a good Sign (1.) if the Bone be heard to snap or crack in its Reduction. (2.) When the disordered Limb is found to be of the same Length with the sound one. (3.) When the Pains grow less. Or lastly, (4.) when the Limb can perform its usual Motion.

How to know when the Bones are rightly replaced.

V. But as Fractures are often prevented from being directly set by being attended with Inflammation, Hæmorrhage, or Tumor ; so also Luxations often cannot be safely reduced before those impeding Symptoms are first removed, or at least much abated, by a proper Treatment. (See *Book II. Chap. II. § XI.*) In such Cases also where the Luxation is accompanied with a Fracture, the Reduction must be put off till that is first set and joined : For the Extension cannot be safely attempted till the Fracture be well joined by a firm *Callus*.

The Reduction is often to be delayed.

VI. After the Bones have been pushed into their Places from whence they were forced out, the next Business is carefully to retain them there. But Bones that are intire are much easier retained than those that have been broken : For the latter cannot be contained in their right Posture without strict Bandage and Rest ; whereas there is in the first Case seldom much Occasion for Bandage, or any great Rest. For thus in fresh Dislocations of the Jaw, Bones of the Fingers, Hands, *Cubitus*, and *Humerus*, the Bone may be immediately reduced without further Bandage or Rest ; because they are generally held firm enough by their proper Ligaments and Muscles. It seems rather more necessary to bend, extend, and gently move the Limb sometimes, than to endanger its becoming stiff and immoveable by a long Inactivity. But when the Luxation happens in the lower Extremities, it seems better to let the Patient rest a few Days in his Bed, moving the Limb gently as soon as he finds it capable, and afterwards he may rise and walk cautiously with it.

How the luxated Limb is to be treated after Reduction.

VII. On the other hand, when the Ligaments have been much stretched by a violent and long continued Distension, or have been rendered infirm by any other means, it seems altogether necessary to make use of some proper Bandage, and to recommend Rest to the Patient, till the Ligaments have regained their former Strength. But here it must be also carefully observed, to let the disordered Articulation sometimes have a little gentle Motion, by an easy Flexion and Extension of the Limb, to prevent any Stiffness or other bad Consequence from such a continued Rest. In the mean Time, it may not be improper to moisten the Bandages and bathe the Part well with *Sp. Vin. Aq. Hungar.* or some other warm and strengthening Spirit, by which Means the Ligaments are used to become very firm and strong. The Bandages themselves should be neither too tight nor too loose : The Reason for which, we have given in *Book II.*

Of an inveterate Luxation.

Chap.

Chap. I. § XXXIV. treating on Fractures. As for the Application of Plasters, which has been such a prevailing Custom in these Cases, they may be altogether omitted here, as in Fractures, without any Danger: They seem even to do more Service by their Absence than Presence.

Of the
Symptoms
of Luxations.

VIII. The Inflammations, Tumors, Pains, Convulsions, Hæmorrhages, and other such Symptoms which happen before or after the Reduction of a Luxation, are to be treated and cured in the same Method with that we prescribed before in the Cure of Wounds and Fractures, *Book I. Chap. II. § XVII, XVIII, Book II. Chap. II. § I.* But as soon as the Bones are replaced, the forementioned Symptoms generally vanish, by Degrees, of themselves. When the Ligaments are very much weakened, it is extremely useful to bathe the Part, after it has been first well rubbed with hot Linen Cloths, with highly rectified Spirit of Wine set on Fire, using plentifully afterwards some strengthening Spirit, (as at *Book II. Chap. II. § IX.*) and then binding it up with a proper Bandage. But if violent Pains should remain, notwithstanding the Luxation be reduced, there is Reason to fear that there is a Fracture along with it. We must therefore endeavour to be satisfied with regard to this Certainty; and if we find a Fracture, we must use our Endeavours to set it. But if you find no Fracture, you must persevere in applying strengthening Fomentations and highly rectified Spirits; for after considerable Dislocations, (especially in the Knee or Foot, which bear the Stress of the Body) if they are not immediately reduced, the Pains often prove obstinate, are of long Continuance, and require great Patience. If a slight Fever should attend, Bleeding, a thin Diet, and cooling Medicines are to be used. If a Gangrene should appear, which may sometimes happen, it must be treated not only with the Medicines which we have before recommended, but also with Fomentations and digestive Cataplasms, binding up with the eighteen-headed Bandage. For the rest of the Symptoms, they may be treated as we proposed, *Book II. Chap. II.*, always taking Care to let the Dislocation be reduced first. If a Luxation should be attended with a Wound, we must make use of the eighteen-headed Bandage, and proceed with the rest as we have directed in Hæmorrhages, *Book II. Chap. II.* in the Doctrine of Wounds. If in Dislocations attended with a Wound, an Hæmorrhage ensue, you must proceed at the first Dressing in the Method above described, where we treated of Wounds, *Book I. Chap. II.* and the Wound must be healed with balsamic Medicines. If an Abscess should be formed, it will be much the best to open it as soon as ever we find it to be ripe: For else there will be Danger left by the long stay of Matter, it should corrode the Articulation and Bones, and produce the worst Kind of *Fistula*, which are often to be remedied by no Means, but that of amputating the Limb. When the Bones are dislocated with so much Violence as to break and destroy the Ligaments, Tendons, and adjacent Skin; the Case is then, as HIPPOCRATES has observed, altogether incurable. For the more we strive to replace them, the less Inclination have they to join again firmly; and by exciting Convulsions and a Gangrene, take off the Patient. Therefore whenever Luxations are attended with such grievous Accidents as are certainly desperate, if we would preserve the Life of the Patient, we must of Necessity speedily take the Member intirely off. If the Luxation is attended with a Fracture, then the Luxation must be reduced first, if possible,

and

and the Fracture is to be set afterwards. But when this cannot be done, it will be proper to have Recourse to what we have before observed on Fractures, *Book II. Chap. II. § XI.* If any Joint should become stiff and immoveable, it will be proper to treat it in the Manner mentioned near the Place now cited. Lastly, if the Luxation be inveterate, and the dislocated Bone, after the Use of Baths and emollient Fomentations cannot yet be reduced, it is much better to abstain from violent Extensions, and give it up, than to torture the Patient with excessive Pains which might probably excite the most grievous Symptoms.

C H A P. III.

Of LUXATIONS in particular; and on those of the HEAD and NOSE.

I. **H**AVING treated of Luxations in general, it remains that we consider each particular Luxation by itself. We shall therefore begin first, with those of the Head, and then descend to the rest, as we did in expounding the Doctrine of Fractures. There are not wanting some who deem it a Luxation of the Head, when the Bones of the *Cranium* are separated any Distance from each other; whether it proceeds from an *Hydrocephalus* in Infants, or from violent Head-achs, or ardent Fevers in Adults. But there is no room for us here to treat more largely on these Luxations. The Method of treating the first, we shall deliver when we come to consider the *Hydrocephalus*. But as the other very seldom, if ever, happens, it seems to be curable by no other Method than that of Bandage and Compression.

Dislocation of the Head.

II. It sometimes, though not often, happens, that the Bones of the Nose are separated from each other, or distorted out of their natural Places by some violent Blow or Fall. When such an Accident happens, it is several Ways discoverable: As (1.) by the Sight, when we behold the deformed Position of the Nose. Or (2.) by Feeling. Or lastly, (3.) by the Ear, when we perceive with what Difficulty the Patient draws his Breath through his Nostrils. But as we before observed, these Luxations do but seldom happen: For the Bones of the Nose are so firmly connected to the *Os Frontis* and other Bones, that they will sooner break than separate from each other.

Luxation of the Nose.

III. When this Case happens, the Patient is to be speedily placed in a high Chair, that an Assistant may stand behind and hold his Head firm, in a proper Posture. The Surgeon is then to introduce with one Hand, a thick Probe, a Goose-quill, (as in the Case of a Fracture, *Book I. Chap. III.*) or little Stick shaped for the Purpose, up the Nostril internally, by which means the depressed Parts of the Nose may be thrust into their Places. In the mean Time he applies his other Hand externally, to guide and direct the Parts which are moved from within. This being done, there is scarce any thing else required but to let a bit of sticking Plaster lie upon the Nose at the same Time. But if any thing should occasion a Wound in the Nose at the same Time, the Cure must be carried on in the Way which we proposed before under a Fracture of the Nose.

Cure of a luxated Nose.

IV. If

IV. If a Tooth be removed from its Place by a Fracture of the Jaw, or any other Accident, it may be properly termed a Luxation. But this, when replaced, from the Testimony of many Writers, generally settles again in its Socket, and adheres firmly to the Gums.

CHAP. IV.

Of a DISLOCATION of the LOWER JAW.

How the
Jaw may be
luxated.

I. **T**HE Lower Jaw is indeed seldom luxated, because it is held so firm by strong Ligaments and Muscles, by whose Assistance it is retained in two *Sinuses* in the Basis of the *Cranium*. But when it is by Accident forced out from thence, it may chance to be on one Side only, or else on both, it being then thrust directly forwards. And this happens most frequently from opening the Mouth too wide in yawning: Though it has sometimes been occasioned by a violent Blow or Fall. If it be luxated on both Sides, the Chin will incline downward, and the Jaw will be thrust very forward: But if only on one Side, the Chin will be inclined toward the opposite Side; the elapsed little Head of the Jaw not being capable of Dislocation but forward and inward*; for the Processes of the Bones of the *Cranium* prevent the Jaw from being dislocated backwards. Hence it seems strange that any one should assert, contrary to the common Observations and Writings of the best Practitioners, that the Lower Jaw may be luxated backwards as well as forwards. This is so inconsistent, that though he should confirm his Opinion by Examples and Observations, it must be looked upon as the Consequence of some Difference in the Articulation from what is usual in Nature.

How to dis-
cover a Lux-
ation of the
Lower Jaw.

II. The Lower Jaw is chiefly known to be luxated on one Side, when the Chin is distorted on the opposite Side. For that Part to which the Chin inclines, is the sound: But that from whence it recedes, is the luxated one. The Mouth in this Case gapes wider than usual, so that the Patient cannot shut it, nor eat with his Teeth; the lower Range of Teeth being projected beyond, and on one Side the Upper. But when the Jaw is luxated on both Sides, then the Mouth not only gapes wide and open, but the Chin also hangs down, and is thrown directly forwards: So that it is no wonder if the Patient cannot shut his Mouth, speak distinctly, or even swallow any thing without much Difficulty.

Prognosis.

III. When the Jaw is out only on one Side, and the Case recent, the Cure is usually not so very difficult, But when both Heads are dislocated, and not presently restored to their Places, it always occasions the worst of Symptoms, as Pains, Inflammations, Convulsions, Fevers, Vomiting, and at length, as HIPPOCRATES observes, Death itself comes on. And these Symptoms are the more violent, as the adjacent Nerves, Tendons, and Ligaments suffer a greater Extension. But if an expert Surgeon comes in Time, the Luxation is not very difficult to reduce.

Cure.

IV. When this Kind of Luxation happens, the Patient is to be directly seated on a low Stool, so that an Assistant may hold his Head firm back against his Breast. Then the Surgeon is to thrust his two Thumbs as far back into the Patient's Mouth as he well can: But they are to be first wrapped round in a Handker-

* See MONRO's learned Dissertation on this Subject. *Art. Edinb.* Vol. I. Art. II.

chief,

chief, to prevent them from slipping or being hurt; and his other Fingers are to be applied to the Jaw externally. When he has got firm hold of the Jaw, it is to be strongly pressed, first downwards, then backwards, and lastly upwards, but so as that they may be all done in one Instant: By which means the elapsed Heads of the Jaw may be very easily shoved into their former Cavities. But the Surgeon ought to be always careful to snatch his Thumbs quickly out of the Patient's Mouth, lest they should be compressed, bruised, or bit, by reducing the Jaw into its Place.

V. If the Jaw be out on one Side only, every thing must be done in the same Manner: But the luxated Side of the Jaw must be forced more strongly downward and backward than the sound one. Some say this Luxation may be sometimes very readily reduced by a violent Stroke on the opposite Side of the Jaw: But this is a Method too pleasant to be used with Safety in most Patients. As for Bandages there seems to be no great Occasion for them in this Case, unless the Luxation has remained some time before it was reduced; for then it may not be improper to apply for several Days the four-headed Bandage, with some strengthening Spirit, which may be taken off when the Patient intends to eat.

Of the Jaw
luxated on
one Side.

CHAP. V.

Of LUXATIONS of the HEAD and SPINE.

I. THE Luxations which happen in the *Spine* and *Vertebrae* of the Back are generally imperfect Ones. For it appears from an accurate Consideration of the Structure and Articulation of these Bones, that none of the *Vertebrae* can be entirely displaced without being fractured, and also compressing or wounding the Spinal Marrow, which must produce Danger of instant Death. Even the imperfect Luxations of these Bones are very dangerous: Which happen either between the two superior *Vertebrae* of the Neck and the Head, or else between the rest of the *Vertebrae*, when they are forced from each other.

How the
Vertebrae
may be lux-
ated.

II. Such as have a Luxation between the Head and upper *Vertebra*, seldom escape being carried off by a speedy and sudden Death. For in this Case the tender *Medulla* which joins immediately with the Brain, and is lodged in the Spine, the Brain itself, and the Nerves which arise beneath the *Occiput*, are too much distended, compressed, or lacerated. The two condyloide Processes of the *Occiput* usually slip out of their glenoid Sinus's in the first *Vertebra* of the Neck, when a Person falls headlong from a high Place, from off a Ladder, from on Horseback, or when he receives a violent Blow upon his Neck. They dying very suddenly in this Case, are vulgarly said to have broke their Neck, tho' there is generally no more than a Luxation: Yet it sometimes happens that the *Vertebrae* of the Neck are really fractured. If Life should remain after such a Luxation, which very rarely happens, the Patient's Head is commonly distorted with his Chin close down to his Breast, so that he can neither swallow any thing, nor speak, nor even move any Part that is below his Neck. Therefore, if speedy Assistance be not had, Death ensues, from the Compressure or Hurt of the *Medulla*.

Luxation of
the Head.

Z

III. But

How the
Head is to be
placed.

III. But to repulse this unwelcome Messenger, the Patient is to be immediately laid flat upon the Ground or Floor. Then the Surgeon kneeling down with his Knees against the Patient's Shoulders, is to bring them together so as to contain the Patient's Neck between them: This done, he quickly lays hold of the Patient's Head with both his Hands, and strongly pulling or extending it, he gently moves it from one Side to the other; till he finds, by a Noise, the natural Posture of the Neck, and the Remission of the Symptoms, that the Dislocation is properly reduced. By this Method the Surgeon retains the Patient firm between his Knees, and performs the Extension and Reduction with his Hands.

Another
Method of
Reduction.

IV. The same may be effected by another Method much like the former: As when the Patient sits upon the Ground, his Shoulders being pressed down, and his Head laid hold of under the Ears, and pulled strongly, but cautiously upwards, inclining it a little to each Side, till the Signs enumerated before (§ III.) demonstrate it to be restored to its natural Place. If any of the other *Vertebrae* of the Neck should be dislocated, the Reduction is to be made in the same manner: Therefore there is no occasion to give them here a separate Treatment.

PETIT'S
Method of
Reduction.

V. But M. PETIT (*Lib. de Morb. Off.*) rejecting the former Methods, has taught us another Way of restoring a Luxation of the Head, though he does not mention that he ever used it. He forms two Slings, having a large Opening about their Middle, as is delineated in *Tab. X. Fig. 1, 2.* The Patient lying on his Back, he takes the Sling, *Fig. 1.* and puts his Head through the Opening AB, which is made purposely large enough, and proportionable to the Size of the Head: The Part of the Sling A comes under the Patient's Chin, the Part B is placed under the *Occiput*, and the two Extremities of the Loop CC, come up over his Ears, the Ends D and E being the Parts by which the Extension is made. But to hold the Patient firm, he recommends another Sling, *Fig. 2.* through whose Opening F, the Head is transmitted so as to make the Part of the Sling G come down his Back, and the Part H to come over his Breast, the two Extremities of the Sling II, are to be joined together between the Thighs, and by this means the Body is to be held from giving Way to the Extension made by the other. While the Head and *Vertebrae* of the Neck are kept sufficiently extended by pulling these Slings in opposite Directions, the Surgeon endeavours to replace the luxated Bones. But, to say Truth, the preceding Methods seem to me to have the Preference: Partly because they are more simple and performed without any Assistants or other Instruments than the Hands, which former are not always to be had; and partly because the Patient may be relieved much sooner by these Means; for while the Machinery is fetching or adapting, the Patient will, in all Probability, be dead. PETIT lays down no other Method of reducing this Luxation, throughout his whole Book, than by his Slings, not even how to assist the Patient in such Cases: Whereas the Accident may happen very often in the Country, where such Slings and Assistants cannot be had to help the Patient. In the mean time, a Napkin, or long Slip of Linen of two or three Hands breadth, slit to let the Patient's Head through, will make a good Substitute for these Slings when they are not at hand.

What is to
be further
done.

VI. But after any of the *Vertebrae* are replaced by any Method, it will be proper, in order to prevent a Tumor, and restore the stretched Ligaments of the

the Neck to their former Vigour, to bathe it with *Aq. Hungar. Sp. Vin. Camph.* or some other strengthening Spirit applied warm, as also Compresses dipped in the same: The Patient should bleed, and rest gently for some Days, till the Neck be found sufficiently strong and well. As for Bandages, there seems to be little occasion for them here, unless it be such as are designed to keep on the Compresses, dipped in some strengthening Spirit.

VII. With respect to the rest of the *Vertebrae* of the Back, they are seldom moved quite out of their Places, unless they are fractured, they being retained for the greatest Part, by adhering to the adjacent Ligaments and Muscles. Therefore the Luxations which happen among them are usually imperfect; no more being displaced than their two upper or lower Processes, and they often but on one Side. And this happens sometimes to one of the Spinal *Vertebrae*, and sometimes to more. But it is here to be briefly observed, that it is usual to include among the Number of luxated *Vertebrae*, that which is sound and firm, but intercepted by others which are not so. Thus whenever the upper *Vertebra* of the Loins from the last of the Back, and lowermost *Vertebra* of the Loins next the *Os Sacrum* are luxated, we commonly say and reckon there are five *Vertebrae* out of their Places: When strictly speaking, only the two outermost or the uppermost and lowermost of those *Vertebrae* are disturbed; the three middle Ones retaining their natural Situation and Connection.

VIII. If any one closely considers the natural Structure and Connection of these Bones, it will pretty evidently appear, that the Spinal *Vertebrae* are not to be luxated but by some very considerable Violence. For, besides their being most closely joined to each other by means of *Processes* or *Apophyses*, they are tied together and connected very firmly by exceeding strong Ligaments and Cartilages. And this is the Reason why the Spinal *Vertebrae* are not luxated, unless those Cartilages and Ligaments should break, in violently bending the Back, or receiving some great Blow or Fall thereon: For these Accidents are generally so far from separating them, that they drive them more closely together. But if this should happen from some very great Violence, it shatters the Spinal *Vertebrae* and their *Medulla*, and quickly kills the Patient, as I myself have sometimes seen. Therefore whenever a *Vertebra* is luxated without being fractured, the Body must, of Necessity, incline strongly forwards, or on one Side. For in this Case, the superior Processes of the *Vertebrae*, by which they are fastened to each other, will be separated from the inferior Processes, by which means the *Vertebrae* will be disposed to be easily removed from each other: And they will incline towards the right Side, when the Hurt is on the Left, and the contrary.

IX. The Signs common to Luxations in the *Spina Dorfi* are chiefly the following: The Back itself is found to be crooked or unequal, after the external Violence has been inflicted: The Patient can neither stand nor walk, and his whole Body seems to be paralytic. The Parts which are beneath the luxated *Vertebra* are nearly without all Sense and Motion: The Excrements and Urine cannot be discharged, or else they are sometimes emitted involuntarily; the lower Extremities grow dead by Degrees; and, at length, Death itself follows. But these Symptoms vary in Proportion to the Degree of Violence in the Luxation: For the more Disorder the *Spina Dorfi* undergoes, the more grievous and dangerous will be the consequent Symptoms.

Of Luxations in the other *Vertebrae* of the Back.

How Luxations of the Spinal *Vertebrae* can happen.

The common Signs of Luxations in the *Vertebrae*.

The particular or proper Signs.

X. But what Number of the Spinal *Vertebrae* are luxated, must be judged of by the Degree of that preternatural Incurvation*. For where there is but one *Vertebra* luxated, the Curvature is gibbous, making a Sort of Angle. If the Processes of the *Vertebrae* are displaced forwards, then the *Spina Dorsi* will seem to bend inwards; and the Patient will always have violent Pains upon bending his Body: On the contrary, when he lies upon his Back, the Pains will be more gentle. If the *Vertebra* is luxated on the right Side, the Body may be observed to incline towards the Left, and it will be easier bent on the right than left Side: If the *Vertebra* be luxated on the left Side, the contrary of all these Appearances usually follow.

Prognosis.

XI. If any one be desirous to preface the dubious Events of Luxation in the *Vertebrae*, I would have him remember that these Cases are generally very dangerous and uncertain: And that, even when the *Medulla* is neither contused nor wounded, but from the Difficulty of reducing the luxated *Vertebrae*: And the more the *Vertebrae* are displaced, the more will the *Medulla* be injured, the worse will be the Symptoms that arise, and the more precipitate will be the Patient's End. The nearer the luxated *Vertebra* is to the Head, the greater and more extensive is the consequent Danger. For as Injuries are the easiest to be inflicted upon the *Medulla* in those Parts, so they are always of the worst Consequence. Therefore Luxations in the Neck are always more pernicious than those which happen in the Back; and those in the Back are much worse than those which happen in the Loins. And what may seem wonderful is, that the Symptoms appear much milder in Cases where several *Vertebrae* are luxated, than they do when there is only one; and still much milder, when the Processes on both Sides are displaced, than when only one of them are luxated. For in the latter of these Cases, the *Medulla* is more compressed upon a less Space, as will appear evident to such as carefully consider the Structure of the *Spina Dorsi*. But then in slight Luxations the *Vertebrae* may be more easily replaced, and therefore Men may be often in less Danger of Death on that Account.

Cure.

XII. To make the Case no better than it is, Luxations of the Spinal *Vertebrae* are, in general, very difficult to reduce. The Artifices used by the Ancients were so foreign and unadequate to the Case, that they seem to have been used to no Purpose, proving rather a Torture than a Remedy. The following seems to be the most suitable Method of reducing Luxations of the *Vertebrae*: When the *Apophyses* of the *Vertebrae* are dislocated on both Sides, the Patient is to be laid leaning upon his Belly over a Cask, Drum, or some other gibbous Body. Then two Assistants are strongly to press down both the Ends of the luxated Spine, on each Side: By which means the Bone of the Spine will be set free from each other, lifted or pushed up in the Form of an Arch, and so gradually extended. This done, the Surgeon presses down the luxated *Vertebrae*, and at the same time nimbly pushes the superior Part of the Body upwards: And by this Means the luxated *Vertebrae* are sometimes commodiously reduced into their right Places. But if Success should not attend the first Time, the Method should be repeated two or three Times more.

XIII. PETIT lays a thick Cloth rolled up like a Cylinder across upon the Bed, and placing the Patient over it, treats him in the same Method which we just now proposed. When the *Vertebra* comes out on one Side, the Patient is then

* See SAVIARD's *Obs.* of Luxations of the *Vertebrae Dorsi*.

to be placed inclining in the prone Posture now mentioned; but so that, when the left *Apophysis* is displaced, one Assistant may press the lower *Vertebrae* inwards to the Right, and another Assistant may depress the right *Humerus*, & *vice versa*. For if there be any convenient Method of reducing the Spinal *Vertebrae* when luxated, there can scarce be any more commodious than that here proposed. And from hence I see it will appear evident, that the generality of those Slings, Bandages, Pullies, Leavers, and other Instruments, which the antient Surgeons used to fasten about the Patient's Hips, Shoulders, and Breast, and are to be seen figured and described in ORIBASIVS, PAREY, and SCULTETUS, must be on every hand allowed to be so far from suitable for reducing these Luxations, that they must be generally pernicious.

XIV. For the Remainder, it seems proper, after the *Vertebrae* are reduced, to bathe the Spine with *Sp. Vin.* or to lay on Compresses dipped in *Sp. Vin. Camph.* and to bind the Parts up with the *Napkin-and-Scapulary*. Afterwards the Patient is to be laid in a soft and even Bed: Bleeding, and bathing the weak Parts with strengthening Spirits, are to be used as there may be Occasion. The Bandage must be very seldom taken off, and all the Symptoms which happen in these Luxations are to be palliated as usual, till the Cure is perfected.

C H A P. VI.

Of LUXATIONS of the Os Coccyx, Ribs, and Clavicles.

I. **T**HE *Os Coccyx* may be thrust inwards by a violent Fall or Blow, and it is often pushed outwards in hard Birth. When this happens, it is usually attended by violent Pain and Inflammation about the lower Part of the Spine, Abscesses form in the *Intestinum Rectum*, and the *Faeces* are constipated or suppressed. To discover the Luxation of this Bone the more readily, we have Recourse to the Use of our Hands and Eyes, as well as to the Knowledge of the forementioned Symptoms. Nor is the replacing this Bone very difficult, if attempted by a careful and expert Surgeon^a. For if it be thrust outwards, it must be depressed into its right Place by the Thumb: After which may be applied Compresses dipped in warm Wine, or its Spirit, made broad above, and narrow below, to fill up the posterior *Sinus* of the *Nates*: And these may be held on by the T Bandage of HELIODORUS, *Tab. II. Fig. h.* But that Part of this Bandage which comes between the Thighs, should be slit and placed so that the Patient may go to Stool without undoing the Bandage, and to prevent the Bone from being by that Means displaced again.

A Luxation of the Os Coccyx outwards.

II. When the *Os Coccyx* happens to be luxated inwards, the first Finger is to be introduced into the *Anus*: After it has had its Nail cut and been dipped in Oil, it must be thrust as far as possible, that it may the more readily drive out the depressed Bone: The other Fingers being applied externally, are to conduct the Bone into its right Posture. When this has been done, it will be proper for the Patient to rest some time upon the Bed; and when he sits up, it should be in a

Luxation of the Os Coccyx inward.

^a PETIT acquaints us, that, from neglecting the Assistance of a Surgeon in this Case, an Abscess ensued, a Caries, a slow Fever, and which terminated in Death.

See his Treatise on *Diseases of the Bones*, T. I. C. 5.

Chair with a Hole in its Bottom, lest the affected Part should be otherwise compressed or disturbed.

Luxations of
the Ribs.

III. The Ribs are indeed sometimes, tho' but seldom, dislocated. For upon the Assault of some external Violence, it is not uncommon for them to be displaced either upwards, downwards, inwards, or outwards. They cannot be easily luxated outwards, because prevented by the Vertebral Processes, and resisted by very thick and strong Muscles. But when they are drove into the Cavity of the *Thorax*, they not only lacerate the *Pleura*, or Membrane, which lines the Cavity of the *Thorax*, but do generally great Injury to the contained Parts. In consequence whereof arise most sharp Pains, Inflammations, Difficulty of Breathing, Cough, Ulcers, Immobility, and many other dangerous Symptoms of the like Nature. But by what Signs such Dislocations of the Ribs are to be discovered, there is no occasion to consider here at large: Since the external Form and Posture of the Side, with the troublesome Symptoms now enumerated, generally afford evident Demonstration whether any of the Ribs are luxated, and on which Side.

How the
Ribs are to
be reduced,
when lux-
ated upward
or down-
ward.

IV. The more numerous and grievous the consequent Symptoms are, the greater is the Danger, and the more speedily should the Luxation be reduced. When the Rib is dislocated either upwards or downwards, in order to replace it conveniently, the Patient is to be laid on his Belly upon a Table, and the Surgeon must strive to reduce the luxated Rib into its right Place with his Hands: Or, the Arm of the disordered Side may be suspended over a Gate or Ladder, as is shewn by Figures in PAREY and SCULTETUS, and while the Ribs are thus stretched up from each other, the Heads of such as are luxated may be pushed into their former Seat.

How the
Ribs are to
be reduced,
when lux-
ated inter-
nally.

V. But those Luxations, wherein the Heads of the Ribs are forced into the *Thorax*, are generally found to be much the most difficult to reduce; since neither the Hand, nor any other Instrument, can be applied internally to direct the luxated Heads of the Ribs. But notwithstanding there are many eminent Surgeons who pronounce this Case to be wholly incurable; yet, in my Opinion, we ought not to despair of being frequently successful. In this Case it seems proper to lay the Patient on his Belly over some gibbous or cylindric Body, and to move the Fore-part of the Rib inwards towards the Back, shaking it sometimes: For thus generally the Head of the luxated Rib slips into its former Place. But if this Method of Cure will avail nothing, and the deplorable Condition of the Patient requires speedy Help, we have no Remedy left but Incision, and endeavouring to replace the luxated Head of the Rib with the Fingers, Pliers, or little Hooks, after the same Manner which we proposed before in Fractures of the Ribs, *Book I. Chap. X. § VIII, & seq.* In the mean time, where the Symptoms are not very urgent, and the Heads of the Ribs but little displaced, it is adviseable neither to cut the Flesh, nor violently force the Ribs: Because there are several Instances where the luxated Ribs have retained their dislocated Stations without any Hurt. But above all, Care must be taken to lay on a Compress dipped in warm *Sp. Vin.* or *Sp. Vin. Camph.* to be retained on the afflicted Part of the Side by the *Napkin-and-Scapulary*.

Luxations of
the Clavi-
cles.

VI. Tho' the Clavicles are sometimes displaced, it is but seldom, by reason of their strong Ligaments. They may be dislocated either from the Top of the
Sternum

Sternum or *Processus Acromion* of the *Scapula*, to which they are connected, by some external Violence, as a Fall, Blow, the lifting some great Weight, or the like. With regard to the Cure, the sooner Assistance is had to the Patient, the more easily may the Reduction of the Clavicle be performed: But when the first is delayed, the latter will be more difficult, inasmuch that inveterate Luxations of the Clavicles are generally found incurable.

VII. The Clavicles may be dislocated in two Manners from the *Sternum*, ^{(1.) near the Sternum.} either internally towards the *Larynx*, or externally upon the Breast. When the first Case happens, a Cavity may be generally observed upon the Part affected, and the *Trachea* with the Carotid Arteries, the jugular Vein, Nerves, and *Oesophagus*, which are all together, will be very much disturbed and compressed. On the contrary, when it is luxated forwards upon the Breast, it shews itself by a preternatural Tumor instead of a Cavity, upon that Part.

VIII. In what manner the luxated Clavicles may and ought to be extended and reduced again into their natural Places, has no Business to be inserted again in this Place: Because every thing is to be observed the same as we proposed in reducing Fractures of the Clavicles, *Book II. Chap. V. N. 4.* But this must be particularly regarded, to carefully remove the Injuries of the Neck, as soon as the Bones are replaced. If any Kind of Luxation requires an accurate Retention by Bandage, it must certainly be this of the Clavicle: especially when the Luxation has happened some time before its Reduction. For, besides, that the Clavicles have scarce any Muscles to support them, their Ligaments are generally so much stretched and weakened in this Case, that they are in no wise sufficient to sustain the Weight of the Arms. It will therefore be proper to apply such a Bandage to the Neck, as we shall describe at large in the Doctrine of Bandages.

IX. Such Luxations of the Clavicles as happen near the *Processus Acromion*, ^{(2.) near the Acromion.} are generally much the more difficult to discover; so obscure, that as HIPPOCRATES (*Lib. de Articulis, N. 62.*) and PAREY witness, Abundance of the best Physicians, and Surgeons not a few, have been deceived in the *Diagnosis* hereof, taking it to be a Luxation of the *Humerus*, and so have miserably tortured the Patient to no Purpose. Whenever this Luxation happens, as PAREY observes, the superior Part of the *Scapula* sticks up; but in the Place where the Clavicles are separated from the *Acromion* Process, a Cavity may be observed. Most acute Pains arise, and the Arm itself cannot be moved or lifted up. If therefore the luxated Clavicles are not timely reduced, it is no wonder that we meet with some People, who, from neglecting the Case, entirely lose the use of their Arms afterwards, so as that they cannot lift them up to their Head or Mouth. GALEN himself says, (*in Comment. in HIPPOCRAT. Lib. I. de Articulis, N. 62.*) “ I myself had once, in struggling, my Clavicle so vastly separated from the *Acromion*, that there appeared a *Sinus* between the Bones, of near three “ Fingers Breath.” In the mean time, a strict Bandage, continued about the Parts for forty Days to make the disunited Bones again coalesce, will be found very serviceable.

CHAP. VII.

Of a LUXATION of the HUMERUS

How the
Humerus
may be dis-
located.

I. **T**HE *Humerus*, from the Length and Laxity of its Ligaments, the Largeness of its Motion, and the Shallowness of the Cavity in the *Scapula*, into which it is articulated, is thereby rendered of all Bones the most subject and easy to be luxated. The Head of this Bone may often be dislocated under the Arm-pit, sometimes forwards, sometimes backwards, and even below the *Scapula*; but seldom perpendicularly downwards, and never directly upwards, unless the *Acromion* and *Coracoide* Processes of the *Scapula* should chance to be fractured at the same Time. Besides, as long as the strong *deltoide* and *bicipital* Muscles of the *Humerus* remain intire, they greatly resist and keep down the *Humerus* from being luxated upwards.

Signs of a
luxated
Humerus.

II. When the *Humerus* is luxated downwards (1.) there suddenly appears a Cavity, and upon pressing with the Fingers, you will perceive a *Sinus*; but under the Arm there must be a Tumor, because the Head of the Bone is thrust there. (2.) The *Processus Acromion* will seem to stick out further than usual, because of the adjacent *Sinus*. (3.) The luxated Arm will be longer than the other, and it cannot be lifted up towards the Head without violent Pain, and sometimes it cannot be lifted up at all, or even extended. But when the *Humerus* is luxated forwards as well as downwards, there will be observed the same *Sinus* under the *Processus Acromion* as before, and a Tumor will appear from the Head of the *Humerus* projecting towards the Breast, under the *Axilla*: The Arm itself also cannot be moved without exciting the most acute Pain. Lastly, when the *Humerus* is luxated backwards, the *Cubitus* is thrown forwards towards the *Præcordia*, and the Head of the Bone makes a Protuberance in the Shoulder: The Arm itself cannot be bent nor extended, nor even pulled outwards from the Breast, without occasioning the most violent Pains. But no Luxation of this Limb is attended with such dangerous Symptoms, as when it is dislocated forwards or inwards: Because the luxated Head of the *Humerus* cannot avoid injuring the large Arteries and Nerves of the Arm; in consequence of which, various Symptoms will arise.

Prognosis.

III. If Assistance be had to these Luxations soon after they have been inflicted, before the bad Symptoms come on, the Reduction of them into their natural Places again may be effected without much Difficulty: More especially, if the Bone be luxated directly downward or backward, it may be very easily reduced; but very difficultly when luxated inward, under the pectoral Muscle. So it may be easily replaced, when the Arm retains its natural Length: But if it be shorter, and the Accident has been done some Time, or accompanied with Tumor, Inflammation, or a Fracture of the *Processus Acromion*, it is then a very difficult Matter to restore the Limb to its former Strength and Motion. But when the Head of the *Humerus* grows fast to some of the adjacent Parts under the Arm, it can seldom be restored by any means whatever. The Reduction is also more difficult in People that are strong, or fat, than in such as are lean, or weak,

IV. As

IV. As soon therefore as the Luxation is discovered in the *Humerus*, the safest Way will be to seat the Patient on the Floor, or on a low Stool, as at *Tab. X. Fig. 3.* A. Two strong Assistants are to be placed on each Side the Patient, one of which B, should secure his Body, and, if possible, the *Scapula* too*, that it may not give way to the Extension: while the other C, lays firm hold of the luxated Arm with both his Hands, a little above the *Cubitus*, gradually and strongly extending it. But before that Extension be made, the Surgeon himself D, should have a large Napkin, of a sufficient Length, tied at the Ends, and hung about his Neck so that the Knot may be behind; but the other Part of the Napkin E, must hang over his Breast. Then the Patient's Arm must be put through the Napkin up to the Shoulder, and the Surgeon at the same time lays hold of the Head of the *Humerus* with both his Hands. This done, he orders the Assistant to sufficiently extend the Limb, and in the mean time he elevates himself the Head of the Patient's *Humerus* by the Napkin about his Neck, directing it with his Hands, till it slip into its former Cavity in the *Scapula*. But I would advise the Surgeon to move the Head of the *Humerus* one way and the other, according to the Manner in which it is luxated; which must be left entirely to his Discretion. And by this means I have happily reduced a great many recent, though not inveterate Luxations of this Joint, particularly three in one Month, and that by no other Assistance or Machinery.

V. Though the Method now described for reducing this Luxation seems to be the most safe, ready, and commodious of any hitherto invented for that Purpose; yet it is found, that the Extension cannot, by this Means, be made sufficiently strong in some Cases; and this particularly when the Patient is very robust, or when the Case has been delayed some Time, without any Assistance. Therefore when one or two Assistants are not able to retain the Patient, and sufficiently extend his Arm, it is much the best way to use a long Napkin with more Hands; or to apply the Girt of HILDANUS (*Tab. VIII. Fig. 17.*) about the *Humerus*, a little above the *Cubitus*, and to make the Extension by a Rope put through the two Hooks, and by another Rope fastened to the middle of that, letting as many Assistants pull as may be sufficient, according to the Circumstances of the Case. But when the Extension is made with a great Force, it requires to be antagonised by a still greater Force, to keep the Patient steady. Therefore it is proper to retain the Patient by two Assistants; and if they are not sufficient, to use a long Napkin or Piece of strong Linen, slit and made in form of the Slings at *Tab. X. Fig. 1, 2.* that the luxated *Humerus* may be put through the Slit up to the *Scapula*. The one half of this Linen Sling should come over the Breast, the other half behind the Back, and both to meet afterwards together in a Knot: This is to be fastened upon a Hook, or given into the Hands of several Assistants, or else it may be fastened to a Beam, or some other fixed Point, so as to keep the Patient from being moved out of his Place. While this is performing, the Surgeon's immediate Business is, to accurately lift up, agitate, and restore the luxated Bone to its right Place, as we before directed. But when this Method also alone is insufficient to extend the *Humerus*, it will be proper to apply to it the Pulley, *Tab. VIII. Fig. 15.* and keeping the Patient firm, to make a prudent

How a Luxation of the *Humerus* is to be reduced.

The bare Hands are sometimes insufficient for the Extension.

* A particular Stay might be contrived, for retaining the *Scapula*, by a long Napkin perforated in the Middle.

Extension of the *Humerus*, much as we proposed before in a Fracture of the Thigh, *Book II. Chap. VIII. N. III.*

The *Ambe*
of HIPPO-
CRATES.

VI. In these Kinds of Luxations, when the Hands were insufficient for Extension, the Antients, and particularly HIPPOCRATES, made use of a Machine which they called (*ἀμβή*) *Ambe*, which may be seen delineated in *Tab. X. Fig. 4* and *5*. It consists of a Pillar, or *Fulcrum* AA, and the moveable Lever BC, which is placed under and bound to the *Humerus* in the Manner of *Fig. 5*. by the Ligatures EEE. When this is done, the End of the Lever B is carefully and gradually pressed downward; by which means the other End of the Lever C, is moved upward, and thus the luxated Arm is both extended, and its Head replaced at the same time. This was frequently used with so much Success by them, that the Machine got a great Name, and is to this Day called the *Ambe* of HIPPOCRATES^a. Notwithstanding it was very successful, and may be still in such Cases, where the Head of the *Humerus* was luxated directly downward; yet, when the Head of the *Humerus* is luxated on one Side, or beneath the Neck of the *Scapula*, as generally happens, the Instrument elevating only directly upwards could not reduce the Luxation, but confused or lacerated the adjacent Parts, or else threw up and pressed against the Neck of the *Scapula*, often exciting violent Pains, in such Manner that (to say nothing now of its other Defects) it has been generally neglected by most for this long while, and is now wholly rejected.

Of other
Artifices for
this Purpose.

VII. To proceed, we must not omit taking notice here, that there are several other Methods and Contrivances invented, not only by the Antients, but also many of the modern Physicians and Surgeons, for reducing a Luxation of the *Humerus*. Those of the Antients are delineated by ORIBASIVS (*Lib. de Machinamentis*), PAREY (in his *Surgery*, *Book XV.*) GERSDORFF, BRUNSWIG, SCULTETUS (in their *Chirurgical Writings*) and other eminent Surgeons. As for the modern Contrivances, two of their Machines are published in the *Acta Eruditor. Ann. 1683, pag. 37.* another in JUNGKENII *Chirurgica Germanica*, *pag. 168.* where he treats of Luxations; another in PURMANNI *Chirurg. Curios. Tab. XI. pag. 692*; and still another in PETIT'S *Treatise on Diseases of the Bones*. And though these latter seem to be each in great Esteem with their own Authors, every one thinking he had mended the Defects of his Predecessors; yet there are some of the *French* Surgeons who esteem and publicly declare them to be either unnecessary, or less suitable than the *Ambe* of HIPPOCRATES^b. There are even some who look upon all Machines as unnecessary in this Case, but the Hands, and Napkins, or Slings; as GOUÉ, a *French* Man too, in his *Surgery*^c.

Of PE-
TIT'S Ma-
chine.

VIII. But because PETIT is an ingenious Surgeon, and well versed in his Profession, I thought it would be worth while to exhibit here the Machine which he so vastly commends, and to give a short Description thereof. See *Plate X. Fig. 7*. But such as desire a more full Account, may consult the Author's Book of Instruments itself^d. PETIT made it his Business to contrive his Machine so as not only to make a sufficient Extension of the Limb, which

^a See a Book entitled, *Dissertation en forme de Lettre.*

^b See ditto.

^c DOUGLAS too is of Opinion, that Writers in Surgery have been highly blameable in recommending useless and ridiculous Machines in a Luxation of the *Humerus*. *Op. Chirurg. Syll. pag. 47.*

^d As PETIT'S Figures are from Wooden Plates, and but very indifferent, I have endeavoured to represent them as clearly as possible, that they may be better understood.

others had invented Means to answer very well before, but also to make a counter Extension or Resistance at the same time, to retain the Patient, and particularly his *Scapula*, sufficiently firm from giving way to the Extension of the Limb made by the Instrument. With this View he made a sort of Buttreffs or Supporter (*P'Archoutant*) of Ticken, a Foot long, of sufficient Strength, and lined with Leather, as at *Tab. X. Fig. 7.* The Arm is to be first put through the Opening A, so as to make one End B come over the Breast, and the other End C to go cross the Back. Its two Holes, DD, let in the two Horns or Legs of the Machine, *Fig. 6. aa*, whose other End, B, is lodged upon the Ground. In this Machine there are several little Pullies *cc, cc*, as in the *Poyspaston* of *Tab. VIII. Fig. 16.* round which passes the Rope *ddd*: There is also a moveable Handle E, by which the Rope is wound up through the Pullies, and the luxated Arm by that means extended. But that the Arm may be the better extended, he uses a peculiar Sling AA, *Fig. 8.* made of soft and double Leather, fourteen Inches long: This he fastens strongly round the lower Part of the *Os Humeri*, a little above the Elbow; the Skin being first pulled upwards, it is to be kept firm upon the Limb by means of a Silk Cord, three Quarters of an Ell long, sewed in a particular Manner to the Leather of the Sling, and to be fastened by a Knot at the two Ends *bb*: To this Silk Cord is fastened another Sling *cde*, by two moveable Loops *ff*, to which is to be annexed the Rope *ddd*, which passes round the Pullies of the Machine. The Apparatus being all rightly fitted, he orders his Assistant to wind up the Rope by the Handle E, *Fig. 6*; the Rope becomes by that means stretched, and the Arm to which it is fastened is gradually extended. In the mean time the Surgeon directs the Head of the *Humerus* with his Hands, that it may again obtain its natural Place, which it very often does of its own accord, without the Direction of the Surgeon^a.

IX. But to give my Opinion impartially concerning the Use of Machines for reducing a Luxation of the *Humerus*, I must needs say, that the Surgeon's Hands ^{Of other Methods less in use.} and a Napkin, with strong and dextrous Assistants to make the Extension, and hold the Patient firm, will, of themselves, be generally sufficient for the Business: But if any one be willing to use other Methods, he may pitch upon those as the best, which sufficiently extend the Bones, and equally stretch the Muscles every way alike, that the Head of the *Humerus* may be aptly replaced. Upon this Principle we may readily judge whether the *Ambe* of HIPPOCRATES be sufficiently proper or no to be applied in this Case: Or the still more uncertain Method of pulling and extending the luxated Arm over a Gate, Ladder, or Beam, by a Couple of tall and strong Assistants, in such Manner as to lift the Patient off his Legs: Or when a lusty and strong Assistant sits down on the Floor, and presently laying hold of the Patient's Arm, suddenly raises himself up thereby: Or lastly, when the Patient is seated on the Ground; and by placing the Foot under the Head of the *Humerus*, it is violently pulled upward, or any other way extended: All which Methods are handled at large by PAREY, in his *Surgery*, Book XV. But here it must be cautiously observed over and over, that

^a This Machine of PETIT, and his Treatment of a Luxation of the *Humerus*, is smartly censured in a French Journal (*des Sçavans*) M. March, 1734. (which the Author of the late quoted Dissertation has seconded) and many notorious Errors are there discovered.

the Nerves, Veins, Arteries, Muscles, and the Bones themselves, be not contused or broke, by the too great Strength and Suddenness of the Extension. That such Accidents as these may readily happen in a rough Extension of the luxated Arm over a Gate, &c. where the Patient is suspended by it, we shall find no room to doubt, especially if we consider the Reasons and Instances cited by PETIT (in his Chapter on a Luxation of the *Humerus*) and others. And since this is the Case, the Surgeon's principal Care and Business in the Extension will be, to let the Arm be stretched out with a Force strong enough, but equable, before he strives to replace the luxated Head of the Bone: Otherwise he acts to no Purpose, or to a very bad one, by bruising and lacerating the neighbouring Parts.

A new Machine.

X. There is still another new and very considerable Machine with a Pulley, which I received not long ago from a very eminent Surgeon, designed for the Reduction of an obstinate and inveterate Luxation of the *Humerus*; whose great Advantages he very much praised and recommended to me: But because I have not yet had Opportunity to use it, and so could not experience its Effects, I must refer the Description thereof to another Opportunity.

C H A P. VIII.

Of a LUXATION of the CUBITUS.

In what manner the Cubitus may be luxated.

I. **T**HE *Cubitus* consisting of two Bones, the *Ulna* and the *Radius*, is articulated by *Ginglymus*, which the *French* call *Charniere*, as is evident from what is said of these Bones in the Writings of Anatomists. The Connection of these Bones is such, that the *Ulna* or *Cubitus*, as being the largest Bone, and seated in the inferior Part of the Arm, does, of itself, perform the whole Flexion and Extension of the Arm, yet it cannot perform that Motion without carrying the *Radius* along with it: So that the *Radius* always follows the *Ulna* in Flexion and Extension. But on the other hand, the *Radius* may be turned along with the Hand both inward and outward, without at all moving or bending the *Ulna*: As when the Pronation and Supination of the Hand is made thereby. Both these Bones of the *Cubitus* are so articulated with the lower Head of the *Os Humeri*, that large Protuberances are received into deep Cavities or Grooves, and the whole invested and fastened with exceeding strong Ligaments. So that notwithstanding the *Cubitus* may be luxated in all four Directions, outward, inward, forward, and backward, yet it is but seldom that it suffers a perfect or entire Dislocation. Unless the upper Part of the *Ulna*, called *Olecranon*, be broken, or the Ligaments of the *Cubitus* much weakened, by some very great external Violence.

How to discover a Luxation of the Cubitus.

II. If the *Cubitus* be luxated backward, which is the most frequent of all others, then the Arm becomes crooked and shorter, and it cannot be extended. In the inward Part of the Bend of the Arm, the Head of the *Humerus* may be observed to stick out; in the back Part of the same, the Head of the *Ulna* or *Olecranon* will be protuberant, and between both Bones will appear a *Sinus* or Cavity. But it very seldom happens that the *Cubitus* is luxated forward, from the Largeness of the *Olecranon*; unless that be fractured at the same time.

time. But if this should happen, the Head of the *Humerus* will stick out behind, and that of the *Cubitus* before; and there will be a Cavity more or less in Proportion to the Degree of the Luxation. When the *Cubitus* is luxated externally, the Protuberance appears on the Outside of the *Cubitus*; and the contrary when luxated inwards. To conclude, unless the Ligaments and Muscles of the *Cubitus* are quite broken in two, it is so far from being capable of suffering a perfect Dislocation, that no more can happen to it than a Subluxation, *i. e.* it can recede but a very little way out of its right Place. But whatever of this Kind happens, the Case may be very easily understood, by feeling and inspecting the Part, if there be no Tumor: But if the Joint be much swelled, it is very difficult to be discovered.

III. Since, in the more violent Kind of these Luxations of the *Cubitus*, the Tendons and Ligaments must be very much strained; it is no wonder (if these be not speedily helped) that there should follow grievous Pains, Tumors, Inflammations, Convulsions, Vomiting, Fever, and at length Gangrene and Death: An ample Witness whereof is PAREY, in *Book XIV. Chap. 18.* and *Book XVIII. Chap. 33.* And to make no Dissimulation in the Case, when the *Cubitus* is dislocated, it is a very difficult Matter to replace it again, by reason of its Inequalities and strong Ligaments: And this more especially when the Luxation is very violent or inveterate; for the slighter and more recent the Luxation, the more easy will be the Reduction.

IV. Be the Luxation however more or less, the Patient must be speedily placed in a Chair, and both Parts of the Limb, the *Humerus* and the *Cubitus*, must be extended in opposite Directions, by two stout Assistants, till the Muscles are found pretty tight, with a free Space between the Bones. Then the luxated Bone must be replaced with the Surgeon's bare Hands, or together with Bandages: And that the Processes may fall into their *Sinuses*, the *Cubitus* must be afterwards suddenly bent. But if the Tendons and Ligaments are so violently strained, that they can scarce perform their Office; it will not be improper to anoint them well with emollient Oils, Ointments, or the Fat of Animals, or to apply emollient Fomentations and Cataplasms. Where the bare Hands are not sufficient to make a proper Extension upon the Limb in this Case, it will be very proper to use the Means and Instruments which we before proposed in *Book II. Chap. VIII. N. 3 and 4.*

V. As soon as the Reduction has been by these Means effected, the Articulation must be bound up with a proper Bandage, and the Arm is to be afterwards suspended in a Napkin or Sling about the Neck. But Care must be taken, as HIPPOCRATES himself advises, that the Bandage be not suffered to be on too long, nor the Arm to be kept all the Time still, without some gentle Motion. For thus there would be Danger of the Mucilage of the Joint becoming inspissated, whereby the Articulation might become stiff, and quite lose its Motion. But happily to prevent this, it is very necessary to undoe the Bandage every, or every other Day, and to gently bend and extend the Limb: Afterwards, Compresses dipped in burnt Wine, may be applied hot, and held on firm with a Bandage, till the Swelling and Inflammation, if there be any, subside, and the Ligaments and Articulation regain their former Strength.

C H A P. IX.

On LUXATIONS of the HAND, CARPUS, METACARPUS, and FINGERS.

Luxation of
the Hand.

I. **N**otwithstanding the Hand is very accurately connected to the two preceding Bones, and particularly to the *Radius*, by means of the *Carpus* and strong Ligaments, yet it sometimes suffers Luxation in all four Directions. But it is generally not so easy to be luxated on either Side, as forward or backward, because of the two Processes of the *Radius* and *Ulna*, which guard it on each Side. The Hand is said to be *luxated forwards* or *inwards*, when it recedes from the Muscles which bend the Fingers; to be *luxated backward*, when it departs from the Muscles which extend the Fingers. Much also in the same manner, the Hand is judged to be *luxated outward*, when the *Carpus* makes a Tumor near the Thumb, and a Cavity near the little Finger: To be *luxated inward*, when the contrary happens. This being rightly considered, it will not appear difficult to distinguish the Signs by which we are to discover a Luxation of the Hand.

Symptoms
and Prog-
ress.

II. For, if a Luxation of this Kind should happen, it can hardly avoid being accompanied with violent Pains, on account of the Ligaments (though strong) being too vehemently strained: The Fingers also cannot be bent nor extended, from the violent Compression of their Tendons. Upon which account, it is no wonder if there follows grievous Inflammation, Tumor, Abscess, Stiffness of the Joint, Gangrene and *Sphacelus*, or *Caries* of the spongy Bones in the *Carpus*; which evils are seldom remedied but by amputating the Limb. But when the Luxation is but slight and recent, the Cure may be effected with much more Ease, and the Dislocation will not be attended with such grievous Symptoms.

How a Lux-
ation of the
Hand is to
be reduced.

III. It therefore seems to be the safest Way immediately to reduce what is displaced. And that this may succeed the better, two Things are to be chiefly regarded: (1.) That the luxated Hand be sufficiently extended by two Assistants, one of whom is to lay hold of the Hand, and the other of the *Humerus*, pulling in opposite Directions: (2.) That the Part of the extended Hand, where the *Sinus* is, be placed on a Table, or some other flat Body, that whatever sticks up may be depressed. By which Method the Hand, in whatever Part luxated, may be very readily reduced into its natural Seat.

Luxation of
the Carpal
Bones.

IV. It also sometimes happens, that one or two of the eight little Bones of the *Carpus* are luxated and distorted from their natural Seat by some external Violence. When this happens, there will be perceived a Tumor in one Part, and a Cavity in another, which may be also felt by the Fingers; besides, violent Pains will be felt by the Patient. For the rest, as this kind of Luxation is very easily discovered, partly by the Sight, and partly also by Feeling; so, when it is recent, it is almost as readily cured, letting the Hand be extended in the Manner we before proposed (at N. III.) and the dislocated Bone be afterwards forced into its Place.

Luxation of
the Meta-
carpus.

V. The four small Bones, which are found in the *Metacarpus*, or Palm of the Hand, may be sometimes luxated from the *Carpus* itself, to which their upper Parts are connected: Which usually happens from some external Violence; notwithstanding they have a natural Inclination to resist such Luxation. For the

two

two Bones which are seated in the Middle between the two other external Ones, cannot be dislocated to either Side: As the two external Ones which sustain the first and little Fingers cannot be luxated inwardly, but are more easily driven outward: Tho' each of them may be luxated on the fore or back Part of the Hand. But which ever of these happens, the particular Disorder may be discovered and examined by feeling and inspecting, and the Cure may be carried on in altogether the same Method which we directed before at § IV.

VI. Lastly, the Bones of the Fingers, to which we join those of the Thumbs, are liable to Luxation at each of their Articulations, and that in several Directions. But these Accidents, if recent, are both very easy to discover and cure. For the Ligaments being not very robust, the Fat and Muscles thin, and the Sinuses of the Articulations shallow, render the Extension very easy, and the Reduction of them into their former Places may be done very readily. While one Hand of the Surgeon extends the Finger, he strives with his other to replace the Bones in their natural Seat. The Bandage proper to dress the Finger after Reduction will be explained more at large in the third Part of this Book, where we treat professedly on Bandages.

CHAP. X.

Of a LUXATION of the THIGH.

VERY rare is it that the Head of the thigh Bone is displaced out of its *Acetabulum*; tho' formerly it was supposed to be pretty frequent, the Physicians taking a Fracture thereof for a Luxation, as we have observed in treating on Fractures. See *Book II. Chap. VIII. § VI.* and *Book III. Chap. I. § IX.* The Reason whereof may be taken from the Articulation itself. (1.) How very deep is the Sinus, called by the Antients *Sinus Coxa*, and by the Moderns *Acetabulum*, into which the Head of the Thigh-Bone is received. (2.) With what a broad concave Cartilage is almost the whole Head of that Bone covered: (3.) How strong are the Ligaments with which it is fastened. (4.) How greatly is it defended with exceeding stout and thick Muscles. (5.) But how very brittle is the Neck of this Bone beyond any other Part thereof. From all which it appears, that the Neck must be far more frequently and easily broke, especially in Adults, than its Head dislocated^a. And tho' something of this Kind may sometimes happen, so as to make the Head of the Thigh-Bone slip out of its *Acetabulum*; yet that generally proceeds more from internal than external Causes^b. For we find it has been observed by very skilful Physitians, that the Ligaments of the Thigh-Bone, tho' very strong, may be by various Causes, and particularly by a Flux of Humours, so relaxed and weakened, as to let the Head of that Bone slip spontaneously out of its *Acetabulum*: So that it should seem no great Wonder if the Thigh should be sometimes luxated even

^a To these we may add that the celebrated CHESELDEN in his Anatomy says, that upon opening two Subjects, whose Case every body thought to be a Luxation, the Neck of this Bone was found fractured. And WISEMAN, with other eminent Surgeons, wholly deny any Luxation in this.

^b RUYSCH observes that the Head of the Thigh-Bone is seldom dislocated by external Force; but frequently by Humours from within. See his *Thesaur. Anatom.*

while the Patient lies in Bed, without any external Violence, as I have sometimes seen; so that when they rise, one Leg appears longer or shorter than the other, and seems as if it were unhinged. *Vid. HIPPOC. Aph. 59, 60. § VI. ZWINGER Theat. Pract. Part. II. pag. 110. sub tit. Luxatio.*

Happens of-
tener in In-
fants than
Adults.

II. But this Case does not happen so easy in robust Adults, as in such as are more young and tender, as we before observed. For I remember to have several Times observed this Case of a spontaneous Luxation, though other Physicians and Surgeons were of a contrary Opinion, because they could not find that any external Violence had gone before: But though it was preceded by no external Violence, Experience has taught me, that the Head of the Thigh-bone may thus slip out of its *Acetabulum*; being the Consequence of preternatural Humors, or some other Disease, whereby the Ligaments and Articulation are rendered infirm.

When the
Thigh is
luxated, it is
generally
perfectly so.

III. Whenever the said Head of the Thigh-bone is thrust out, it is almost always wholly displaced, so as to make a perfect Luxation. The exact Roundness of this Head, with the great Force of the circumjacent Muscles, and the Narrowness of the Sides of the *Acetabulum*, will not admit the Bone to be dislocated a little way only: For as soon as the Head of this Bone is thrust up to the Edge of the *Acetabulum*, it must unavoidably either turn quite out, or else fall back again into its right Place^a. Yet there are some who hold that the Thigh may suffer an imperfect Luxation.

The Thigh
may be lux-
ated in sever-
al Directi-
ons.

IV. The Thigh is usually luxated four Ways; *upward, downward, backward, and forward*: But is most frequently dislocated downwards and inwards, towards the large *Foramen* in the *Os Pubis*^b. For besides that the cartilaginous Defence on the lower Part of the *Acetabulum* is not so high as the rest, the *Ligamentum rotundum* is found to give way more easily in that Part than any other: And lastly, the adjacent Muscles are found to be weakest in their Resistance on this Part, being insufficient to keep the Head of this Bone from slipping out. And then there is a certain Eminence in this Edge of the *Acetabulum*, which keeps the Head of the *Os Femoris* from falling back again into its right Place. But if the Head of this Bone be displaced outwards, it generally slips upwards at the same time; it being scarce possible but the very strong Muscles of the Thigh must then draw the Bone upwards, and then there is no Eminence there, in the Edge of the *Acetabulum*, to resist the Head of the Bone in that Passage. But should it at any time be luxated by an external Force, there must certainly be a Rupture of the round Ligament; as some Authors have observed.

Signs of the
Thigh lux-
ated (r.)
downward
and forward.

V. When the Thigh is dislocated forwards and downwards, which is what usually happens, the Leg hangs straddling outward, and is longer than the other: Also the Knee and Foot turn outwards: The Head of the Bone itself will be felt near the lower Part of the *Inguen* and *Os Pubis*. Sometimes there is a Suppression of Urine in this Case; when some Nerve, which communicates with the Bladder, is violently compressed. In the Buttock may be perceived a Cavity, from the *Trochanter Major* and the rest of the Bone being displaced: And if the Thigh-bone be not timely replaced into its *Acetabulum*, the whole Limb withers

^a See WISEMAN'S Surgery, pag. m. 463.

^b As VERDUG has observed, *Operat. Chirurg.* pag. m. 300.

shortly afterwards*. And this is the Reason why the Patient can bear little or no Stress upon that Limb, but must always incline and throw the Weight of his Body upon the other, unless he would fall down. In like manner when they walk or go forward, the Person must move that Limb in the Form of a Semi-circle; but as for the Body itself, it is obliged to be supported under the Arms by Assistants, or else by Crutches and Sticks. Though there are not wanting particular Cases, some of which I have been Witness to, where the Head of the luxated Thigh-bone has grown so firmly to the adjacent Parts without the *Acetabulum*, as to become, in process of Time, so strong as to support the Body without Crutches or Sticks, though they always halted in walking.

VI. But if the Thigh-bone be displaced backward, it is usually drawn up-ward also at the same time, as we before observed. Hence there will be perceived a Cavity behind the *Inguen*; but upon the Haunch or Buttock, a Tumor; because the Head and *Trochanter* of this Bone will be thrust there. The Tumor in the Haunch being thrust upwards, the rest of the Limb will become shorter than the other, and the Foot will seem to turn inwards: The Heel will not touch the Ground, and so the Person will seem to stand upon his Toes. And lastly, the luxated Limb may be bent with more Ease than extended: Also the Body is usually sustained more firmly by this Limb when luxated backward than forward; because in the first Case, the Feet are removed farther from each other. And this is the Reason why a great many in Cases of this Kind which have been cured by Surgeons without reducing the Bone, are able to stand firmly and walk, especially if they have a Shoe with a very high Heel to it. But there generally follows something of a slight withering or decay in the Limb afterwards, from the Nerves being in some Measure Compressed: Though this Accident is much slighter here than at § V. Lastly, it is extremely rare that the Thigh is luxated forward or backward, without being also drawn upward or downward, as we before observed: But if it should so happen, it may be evidently discovered by what we have been just now saying, and from considering the Structure of the Articulation.

VII. As it is very difficult to discover whether the Thigh-bone be dislocated or fractured, both by feeling and inspecting, because of the great Thickness of the Muscles and Integuments; it is therefore, in my Opinion, a Matter of some Consequence to propose the following Signs, which we recommend for discerning one from the other. We do not without Reason judge the Thigh to be luxated (1.) when we find the Ligaments of the Bone have been relaxed by some preceding Congestion of Humors, and when no external Violence has been exerted upon it, especially in young Patients: (2.) When neither the Symptoms, Pain, Tumor, or Inflammation follow: And lastly, (3.) when the whole Limb may be bent and turned about at the *Acetabulum* without any crushing of the Bones, which is otherwise common in Fractures. The contrary of these Signs are strong Indications that a Fracture is present: More particularly if the Foot in grown Persons be shorter, from the Injury of any external Violence, and you hear a grating of the Bones in moving the Limb.

VIII. If it be difficult to discover whether the Thigh be fractured or luxated, as we have before made evident; its proper Treatment and Cure will be found much more so. See *Book III. Chap. I. § IX.* For this Difficulty there are many Reasons. For (1.) the Force and Thickness of the adjacent Muscles,

* See HIPPOCRAT. Sect. V. *Apb.* 59, and 60.

(2.) upward and outward.

How to distinguish between a Fracture and a Luxation of the Thigh.

themselves hinder the Thigh from having a sufficient Extension; especially if it be in the stronger Sort of Men. Hence, (2.) for the same Reason the Reduction of the Bone will be very difficult to effect; and when it is effected, it will be a hard Matter to discover. And (3.) if the Thigh should happen to be replaced quite home as it should be, yet there is great Danger of its slipping out again, from the Laxity of the Ligaments and Slipperiness of the Parts. To which we may add (4.) that the Ligaments happen to be sometimes quite broke or lacerated from the Greatness of the external Violence. And we must not forget that (5.) the Mucilage of the Joint becomes often so inspissated in the *Acetabulum*, as not only to prevent its Reduction, but often also, to thrust it out again when once replaced, (6.) in Infants the Head of the luxated Bone increases, and at the same time the *Sinus* contracts; that if there be not a speedy Reduction, there can be none. So that it is no Wonder if such become halt or lame, as have their Thigh-bone luxated, and reduced not at all, or else when it is too late. Yet in this Dislocation in a younger Patient, if it be recent, and the Ligaments are not broke, there are Hopes of reducing it; especially, if you apply proper Remedies. For in this Stage of Life the Muscles are very pliant, and the Bone is easily extended, and replaced: But it is not so easily retained there, in consequence of the Weakness and Flaccidity of the Parts.

Cure of the
Thigh lux-
ated forward
and down-
ward.

IX. The luxated Bone is always to be replaced in a Method agreeable to the Nature and Direction of the Dislocation. When it is displaced forwards and downwards, the Patient is to be laid flat upon his Back on a Table: Then a Linen Napkin or strong Sling is to be made fast over the Groin about the Part affected, so that one End of the Sling may come over the Belly, and the other over the Nates and Back, to be both tied together in a Knot upon the Spine of the *Os Ileum*, and afterwards fastened to a Hook fixed in some Post, or held firm by some Assistants; rather the first, if we use the *Polyspaston* or Pulley, to retain the Patient's Body firm from giving way in the Extension. In like manner, at the Bottom of the Thigh, a little above the Knee, there must be also fastened another Napkin, Sling, or the Girt of HILDANUS at *Tab. VIII. Fig. 17.* with a Compress between it and the Thigh; or PETIT'S Sling, *Plate X. Fig. 8.* Both the Slings being drawn tight, the Thigh is to be extended, not vehemently, but only so much as is sufficient to draw the Bone out of its *Sinus*, that it may be replaced into its *Acetabulum* by the Surgeon's Hands: One Hand is to press the Head of the Thigh-bone outward, while the other conducts the Knee inwards: Or, the Reduction may be made by Napkins, fastened round the Extremities of the Thigh like Slings, much as in a Luxation of the *Humerus*; which will be more likely to succeed, if the Knee be at the same time pressed inwards by the Hands. When the fore-recited Means are not sufficient to make the Extension, it will be necessary to make Use of the *Polyspaston* or Pulley which we proposed before in *Book II. Chap. VIII. § IV.* As soon as the Thigh is found to be sufficiently extended, the Surgeon must take particular Care to restore the luxated Head of the Thigh-bone with his Hands from the *Os Pubis* into its former Seat.

X. Whenever the Thigh is luxated backward, the Patient is to be placed flat on a Table, with his Face downward, and the Thigh is to be extended in directly the same Manner, but a little more strongly than we just now proposed: and the Reduction is to be effected afterwards by the Surgeon's Hands, an Assi-
stant.

stant in the mean time extending the Limb, and turning it inwards. By this Method the Head of the Thigh-bone generally slips very readily again into its *Acetabulum*. This being all rightly effected, the next Business is to let the disordered Limb be well bound up, as we shall teach in the Doctrine of Bandages, and the Patient is to be closely reconciled to rest in his Bed for three or four Weeks, not without the Use of strengthening Medicines.

XI. But in either Case, whether the Thigh be luxated forward and downward or backward and upward, PETIT greatly recommends his Machine before described in the Chapter on a Luxation of the *Humerus*; because the Hand and other Instruments are here very often insufficient, because of the many strong Muscles in this Part. But to make use thereof, the *Retinaculum* or Stay delineated at *Tab. X. Fig. 7.* is required to be not so broad, and it may be without the Opening A, (See *Plate X. Fig. 9.*) as the Thigh is not to be transmitted through it: But the Middle thereof is to be applied to the Tubercle of the *Iscbium*, one End being folded behind, and the other before. The Patient is to be placed on his sound Side, that the luxated Thigh may lie upwards; but the Machine itself is to be placed between the Thighs, the Knee of the distorted Side being a little bent. The Sling *Fig. 8. Tab. X.* is to be fastened firmly round the lower Head of the Thigh, above the Knee, the Skin being first drawn tight upwards, as we advised before in a Luxation of the *Humerus*: It is then to be firmly fastened to the Rope passing round the Pullies of the Machine *Fig. 6. dd.* And lastly, the Legs or Horns of the Machine *a a*, are to be put through the Apertures in the *Retinaculum* *DD*, *Fig. 7.* and by winding up the Rope by the Hand E, *Fig. 6.* it is to be gradually and carefully extended, till the Surgeon perceives by the Limb that it is sufficient. This done, the Surgeon strives to reduce the Head of the Thigh-bone into its *Acetabulum*, from the *Sinus* where it was lodged, as we have before directed at § IX.

The Use of
PETIT'S
Machine.

XII. But more particularly, if the Thigh be luxated forward and downward, and sticks near the large *Foramen* in the *Os Pubis*, the Reduction in this Case is often very difficult. PETIT has in this Case substituted for the Legs or Horns of the Machine *a a* *Fig. 6.* others which are expressed at *Fig. 10.* which have at their Ends transverse or lunar Processes: One of these A, he applies to the *Os Ileum*, and the other B, to the Middle of the Thigh: He afterwards ties a Napkin about the Thigh, near the *Inguen*, which he makes fast to the Rope about the Pullies of the Machine. He then makes the Extension by turning the Handle of the Machine, by which means the Instrument exerts its Force in three different Places: The Part A retains the Patient firm and resists the *Os Ileum* as an immoveable *Fulcrum*; the Part B, when the Rope is drawn tight, turns the lower Part of the Thigh inwards; but the Napkin, which is fastened about the upper Part of the Thigh, does by means of the Rope draw it outward; all which Motions are necessary to be performed, in order to reduce this Luxation. But be cautious against too strong an Extension, because the Limb is already too long of itself: Yet the Extension ought to be continued till the Surgeon can replace the Bone from the *Sinus*, where it was lodged, into its *Acetabulum*: For if it be let loose before this is effected, the Extension will be found to have been altogether useless, and must be repeated again.

More parti-
cularly in a
Luxation
forward and
downward.

XIII. If it should suffer an imperfect Luxation (which yet very seldom, if ever happens, as we observed at § III.) and if the Head of the Bone should stop upon the lower Part of the *Acetabulum*, the upper Part of the Thigh is then to be thrust outwards with one Hand, while the lower Part is pushed inwards by the other, and so the Bone may be properly reduced. But if the Head of the Thigh-bone should stick upon the Edge of the *Acetabulum* backward, a Method contrary to the former must be made use of; *viz.* the upper Part of the Thigh must be thrust inwards by one Hand, while the other Hand conducts the lower Part of the Thigh outwards.

XIV. When the Bone is replaced, it must be retained by the Application of a proper Bandage, called *Spica Inguinalis*, which you will find described in my Treatise on Bandages. And in younger Patients, where the Mischief arises from a Flux of Humours, strengthening Medicines must be given. And for the Revulsion of those Humours an Issue should be made in the Arm of the sound Side; to which such Virtues are attributed, that to this only MULLER ascribes the Cure of these Luxations in young Patients. See his Dissertation on Dislocations of the Thigh, delivered at *Hale* in the Year 1738.

C H A P. XI.

Of a LUXATION of the PATELLA and KNEE, or TIBIA and FIBULA.

Luxation of
the Patella.

I. **T**HE *Patella* is usually luxated mostly on the internal or external Side of the Joint; but if we may credit some Physicians, it is also sometimes displaced both above and below the same. But whenever the Knee is perfectly luxated, the *Patella* can scarce avoid being displaced at the same time, because of its strong Connection to the Thigh and *Tibia*. I must confess there are more than a few among the common Surgeons, who, from their Unskilfulness in Anatomy, and particularly Osteology, are quite doubtful and at a Loss what to think about this Case; nor can they tell what is dislocated when it happens. Hence it is no wonder if they treat this unknown Hurt of the Joint, as a Luxation made in the Knee itself, putting the Patient into various and painful Postures, and torturing him by extending and pressing the Limb to no Purpose. But if one well versed in Anatomy and the Structure of the Articulation should examine the Case with a little more Exactness, there is no room to doubt but from comparing the disordered and sound Limb, he will be able to judge readily whether or no, or in what Part the *Patella* is luxated, and what Method will be proper to be taken for its Cure.

How it is to
be replaced.

II. The Reduction of a luxated *Patella* is usually no very great Difficulty, if the Patient be laid flat on his Back upon a Table or Bed, or if he be laid in that Posture upon an even Floor, so as that the Leg may be pulled out strait by an Assistant. For then the Surgeon may firmly grasp the *Patella* with his Fingers, and afterwards press it strongly into its right Place; which may be also effected if the Patient stands upright. When this is done, there remains nothing but to carefully bind up the disordered Part, and to let the Patient rest quietly for some Days, sometimes gently bending and extending his Leg to prevent

vent it from growing stiff: Till the Pains are gone off, and the Limb has recovered its former Strength.

III. A Luxation of the Knee is properly so, when the *Tibia* recedes from under the *Femur*. The Leg is sometimes luxated from the Basis of the Thigh-bone; either on the out or inside, or backwards: Seldom or never forwards, unless it be forced and driven very violently that way; because forwards, the *Patella* is bound against the Articulation, by the very strong Tendons of the Muscles which extend the Leg. Nor is it easy for the Bones of the Leg to be wholly displaced from that of the Thigh, so as to make a perfect Luxation; by reason of the great Strength of the Ligaments, and the two deep *Sinuses* which receive the Head of the Thigh-bone: Unless those very strong Ligaments should happen to be broke insunder at the same time. And this seems to me to be the Reason why People, who suffer a perfect Luxation of the Knee, are generally tortured with such violent Pains and Convulsions, that they are wholly spent or wasted thereby: Or, if they should escape that, they are generally troubled with Lameness and Stiffness in the Joint. But on the contrary, the slighter the Luxation, or the nearer it approaches to an Imperfect or Subluxation, the more easy it is generally to effect the Reduction and Cure. Yet I myself reduced, some Years since, at *Helmstadt*, a perfect Luxation of the *Tibia* backwards, and that in a robust and jolly Patient, without any other Inconvenience, than his perceiving a Tumor and some Pain in his Knee for a few Weeks: Which were afterwards entirely removed by emollient Fomentations and Cataplasms; and his Leg is perfectly sound to this Day.

Luxation of the Knee.

IV. For the rest, as this kind of Luxation is very easy to discover from the thin covering of the Joint, with the Tumors and Cavities which follow; so, when it is discovered, it is as difficult to make a perfect Cure thereof, without letting the Bones join together; or leaving some Stiffness in the Knee; which first Accident is usually called an *Anchylosis*. For it is scarce possible, that this Case should happen without greatly lacerating or confusing the Ligaments and Glandules which belong to this Articulation, so that their nutritious and mucilaginous Juice being inspissated in the Articulation, prevents the natural Motion of the Joint.

V. When the Knee is but slightly luxated, the Patient is to be seated on a Bed, Bench, or Table, and one Assistant holds the Thigh firm above the Knee, and the other extends the Leg; but the Surgeon in the mean time replaces the Bones by his Hands and Slings, if necessary, (as in the Reduction of the Arm, *Plate X. N. III.*) or pushes it by the Application of his Knee into its natural Place. If the Hands and Slings be not sufficient for this Purpose, it will be necessary to make use of the Instruments before described in *Book II. Chap. I. N. XXI.* as the Girt of *HILDANUS*, and the *Polyspaston* or Pulley, *Tab. VIII. Fig. 15 and 17.* But we must be very careful here, not to make the Extension so violent in Children and young People as to separate the *Epiphyses* from the Bones to which they are not yet firmly united: For by that means a worse Disorder and Lameness will be brought on. After the Luxation of the Knee is rightly reduced, it is to be properly bound up, and placed in a Straw Case; and the rest must be managed as we have before directed concerning the *Patella*, *N. II.*

How it is to be replaced.

VI. Some-

Luxation of
the Fibula.

VI. Sometimes the *Fibula* is separated by some external Violence from the Thigh-bone, and is then distorted either upward or downward: And this generally happens, when the Foot has been luxated outward. Therefore whenever this is the Case, there is need of Extension: The Bone is to be first restored to its natural Place, and then properly bound up, the rest of the Cure being to be carried on as we directed at N. IV and II. 'till it be grown firm again to the *Tibia* and Leg. Lastly, Patients should be frequently cautioned not to use or bear any Stress upon the disordered Leg too soon; unless they would throw themselves into a worse Disorder, an incurable Lameness.

CH A P. XII.

Of a LUXATION of the FOOT and ANCLE.

Luxation of
the Ankle.

I. **T**HE Ankle may be sometimes luxated either in Jumping, Running, or Walking, and that in all four Directions, inward, outward, backward, and forward. Which of these Ways it happens to be luxated, may be discovered by the particular Posture of the Joint: For when it is luxated internally, the Bottom of the Foot is turned outward; and on the contrary, when it is luxated outward, the Bottom of the Foot is turned inward: Which latter Case happens much more frequently than the other. If it should be dislocated forward, the Heel becomes shorter, and the Foot longer than it should be: If backward, the contrary Signs will appear. Lastly, the Ankle can scarce possibly be luxated outward, unless the *Fibula* be separated from the *Tibia*, or else quite broke, which may happen on the external Ankle. An Example whereof may be seen in LE DRAN, *Obs.* 109.

Luxation of
the Ankle
dangerous.

II. Nor is it uncommon for a Luxation of the Ankle to be attended with the most grievous Symptoms, especially when occasioned by some very great external Violence. For it is scarce possible for it to happen otherwise in this Case, since the Distortion of the Foot must overstrain the adjacent Ligaments, Tendons, and Nerves, and thence excite most violent Pains: Or the Veins and Arteries may be also lacerated; by which means there will be a large Extravasation of Blood about the whole Foot, which often gives rise to a Gangrene. Of this Accident DIONIS give an Example in his Book of *Surgery*. Nay, sometimes Death has ensued from this Kind of Luxation, as TULPIUS has remarked, in *Obs. Med. Lib.* IV. *Obs.* 50. Who also quotes HIPPOCRATES on that Subject, *Lib. de Art.* XII. *Hist.* 48. & *Lib.* V. *Epid.*

The Ankle
is sometimes
only contu-
sed.

III. But it seems to be here worth notice, that the Ankle is not always luxated after it has been violently strained by leaping, or turning the Foot on one Side. For it sometimes happens in those Cases, that the Ankle is not dislocated, but retains its proper Place, only the Parts are violently contused and strained: In which Case the Patient may happen to be afflicted with the most sharp Pains, great livid Tumor and Stiffness, so that he can neither stand nor walk, but is obliged to keep his Bed for a long Time. Hence, to attempt an Extension and Reduction in this Case, would be altogether useless and improper.

IV. The

IV. The Angle is more or less difficult to reduce in Proportion to the Violence of the Cause by which it is luxated. It is a general Observation, that Opposites are usually the Consequences of Opposites. But the most ready way of reducing a Luxation of the Angle is to place the Patient upon a Bed, Seat, or Table, letting the Leg and Foot be extended in opposite Directions by two Assistants, while the Surgeon strives to reduce the Angle with his Hands and Fingers. When the Foot is by this Means once replaced, it is proper to bind it up carefully, after it has been well bathed with *Oxycrate* and Salt, advising the Patient to keep to his Bed a good while, 'till the Disorder and its Symptoms quite leave him, and he finds his Angle to have recovered its Strength so far as to sustain the Weight of his Body without any Uneasiness or Danger.

How the Angle is to be reduced.

V. But in a Contusion or great Strain of the Angle, it will be not improper to plunge it suddenly into cold Water, and to repeat it for several Days. If any should not care to undergo the Action of the cold Water, I would persuade him to apply Compresses dipped in *Oxycrate* which has had Salt dissolved in it, binding them on and renewing them often upon the disordered Part. DIONIS runs directly into this Method of Cure. He applies what the Surgeons call a Defensative, made of the White of an Egg and Oil of Roses, and Allom, beat up together, which being spread on Linen, he binds firmly upon the Angles, repeating it frequently. In about three Days after, he makes a Decoction of aromatic and astringent Medicines, as Roses, Wormwood, Rosemary, Granate Peels, and Allom, in Wine; and with this foment the Angle well, and applies Compresses dipped therein, binding them on tighter than before. This continued about a Fortnight, he then applies some strengthening Plaster, 'till the Pain and Weakness vanish,

How a Contusion of the Angle is to be treated.

VI. So stubborn and unmoveable are violent Strains of the Angles in some People, that they will give way neither to the Skill of the Physician, nor Virtue of Medicines, but are only to be removed by Length of Time. Instances are not wanting, where the Foot has been so greatly disordered, a Year after the Luxation, that the Patient could not walk in a way the least uneven, nor go up and down Stairs without great Trouble. To remedy this Disorder, the same is to be carefully observed here, which we observed before at N. IV. The Bandages which are proper here, we shall describe hereafter.

A Contusion of the Angle sometimes difficult to cure.

VII. Sometimes it happens, that only the *Os Calcis* or *Calcaneum* is luxated by some external Force, and that either towards the internal or external Side of the Foot. Which ever way it happens, when there is Pain and Inequality of the Member, that is, when it has a Cavity in one Part, and a Tumor in another, there is strong Reason to suppose a Luxation. And as soon as it is discovered, the same Method of Cure is required with that before recited, keeping the Limb quiet for some time afterwards.

Luxation of the Calcaneum.

VIII Lastly, If any other Bone in the Foot, the *Tarsus* or *Metatarsus*, should happen to be luxated by some considerable external Violence, the Ligaments with the adjacent Nerves and Tendons are generally so affected as to excite not only most acute Pains, but violent Inflammations and Convulsions: And even Death itself has been observed by some Physicians to be the Consequence, unless the Bones were speedily replaced. It is therefore the safest Way to reduce the Luxations in these Bones of the Foot, by the Method we before proposed

Luxations of the other Bones of the Foot.

proposed for those of the Hands, and that with the greatest Expedition. So when any of the Bones in the Toes are dislocated, there is nothing more required than what we proposed before in those of the Fingers. We are however, in the last Place, to recommend the Patient to rest quietly in his Bed for a sufficient Time afterwards.

An EXPLANATION of the TENTH TABLE.

Tab. X.

Fig. 1. Is a Sling which may be used to make an Extension in Luxations of the Head. See the Chapter on Luxations of the Head.

Fig. 2. Is another Sling, to retain the Patient's Body firm in the same Case.

Fig. 3. Shews the most commodious Method of reducing a recent Luxation of the *Humerus*.

A, Is the *Patient*, seated ready to undergo the Operation.

B, Is the *Assistant*, that holds the *Patient* firm in his Seat.

C, Is the *Assistant*, that extends the dislocated *Humerus*.

D, The *Surgeon*, reducing the dislocated *Humerus*.

E, A Napkin, whereby the Surgeon elevates the Arm, in order to its Reduction.

Fig. 4. Is a Machine, commonly called the *Ambe* of HIPPOCRATES, used formerly to reduce Luxations of the *Humerus*: It consists of the *Fulcrum* AA, to which is fastened the moveable Leaver BC, joined to each other by a sort of moveable Articulation D.

Fig. 5. Shews how the former Instrument is to be applied to a Luxation of the *Humerus*. There is some Difference between the Structure of this and the former, at the Joint CD: Some think this is preferable to the last.

AA, Is the *Fulcrum*; BC, the Lever, to which the luxated Arm is fastened by the three Ligatures EEE. D, the Place where the *Fulcrum* and Lever are fastened together by a moveable Joint. When the End of the Lever B is pressed downward the luxated Arm is extended, and lifted up near its *Scapula* E.

Fig. 6. Is PETIT's Machine for reducing Luxations of the *Humerus*, and several others.

a a, Are two Arms or Horns, by which the Patient, and particularly his *Scapula* is held firm, from giving way in the Extension; B, the other End of it, resting upon the Ground or Floor. CC, are the Pullies of the Machine: *d d*, the Rope, by winding up which, an Extension is made. E, is the Handle, which being turned round, draws the Rope tight, and extends the Limb. FF, the Place where the two Horns are joined to the Body of the Machine.

Fig. 7. Is a *Retinaculum*, or Supporter, to be used in a Luxation of the *Humerus*. A, is an Opening or Slit in the Machine. BC, the Form of it at each End. DD, two Apertures, through which the two Legs or Horns *a a* of the Instrument *Fig. 6.* are to be passed.

Fig. 8. Is a particular Sling of Mr. PETIT's, proper for extending luxated Limbs. AA, the Part made with Leather; *bbb*, a Silk Ligature, sewed to the Leather in three Places at 1, 2, 3. The Part AA is fastened round the Arm;

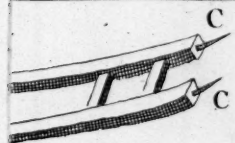


Fig: 6.

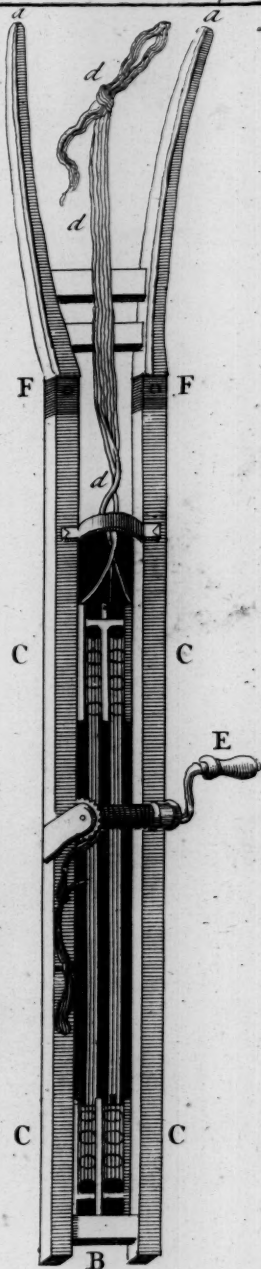
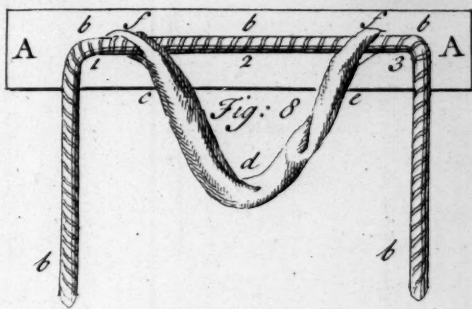
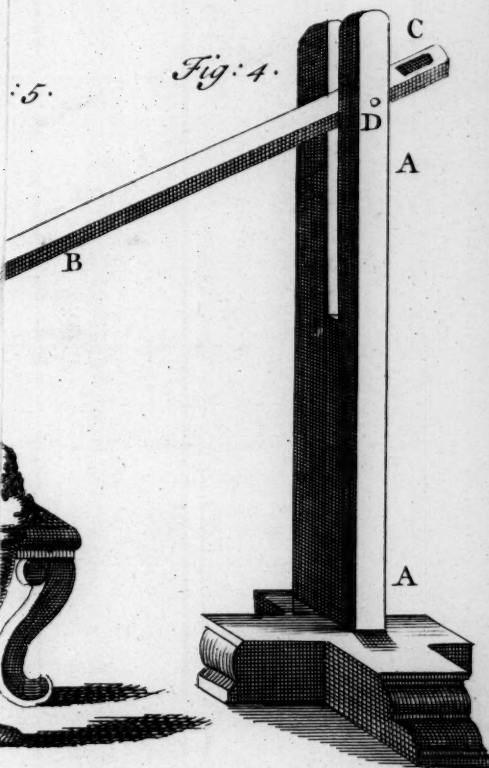


Fig: 1.

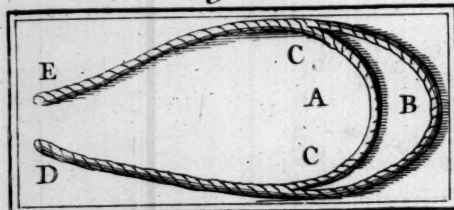


Fig: 2.

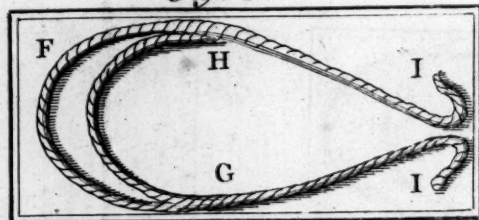
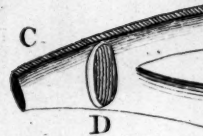
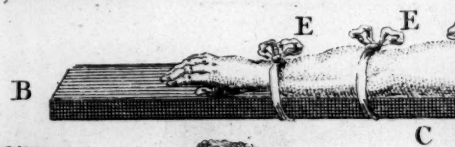
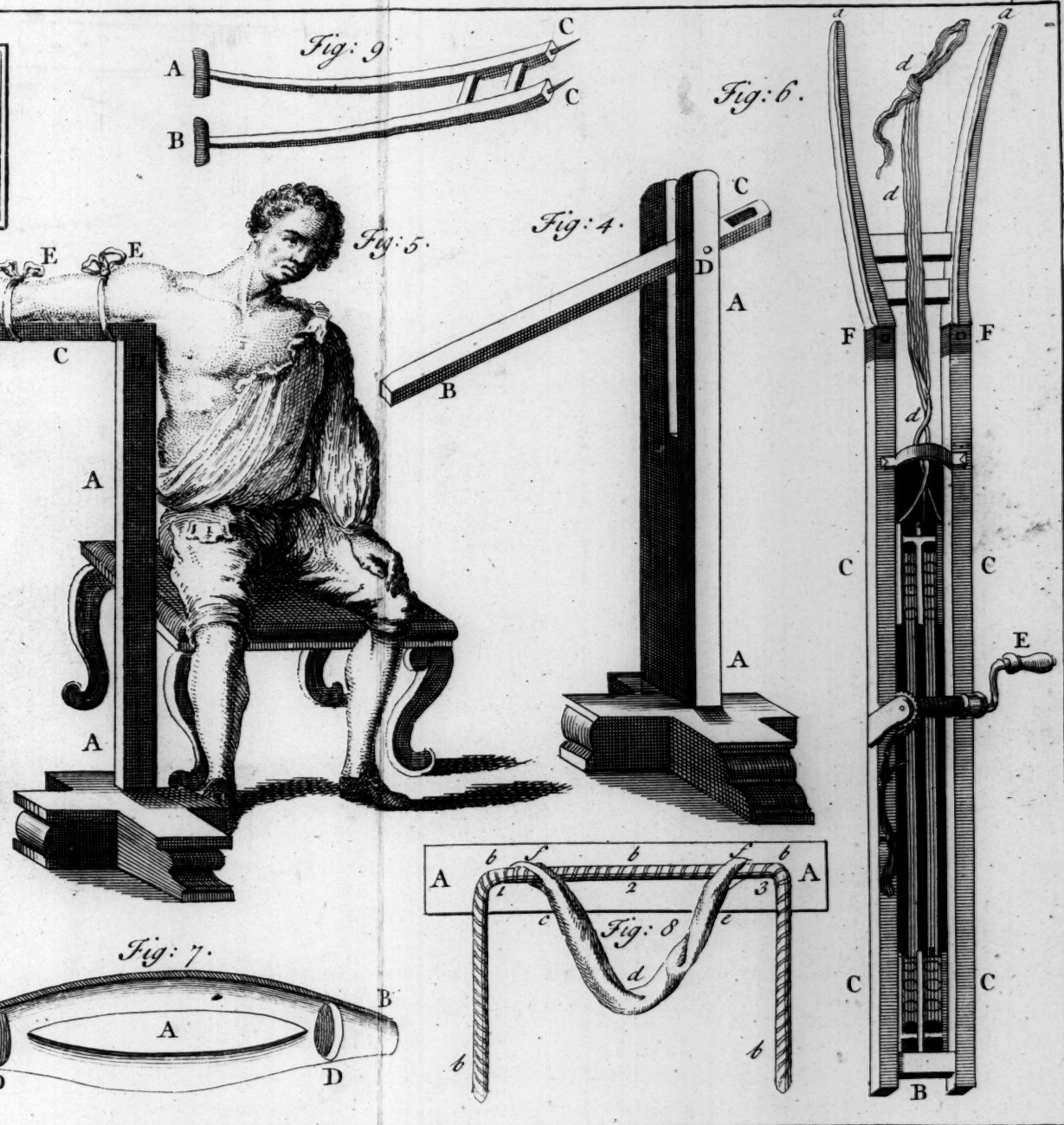
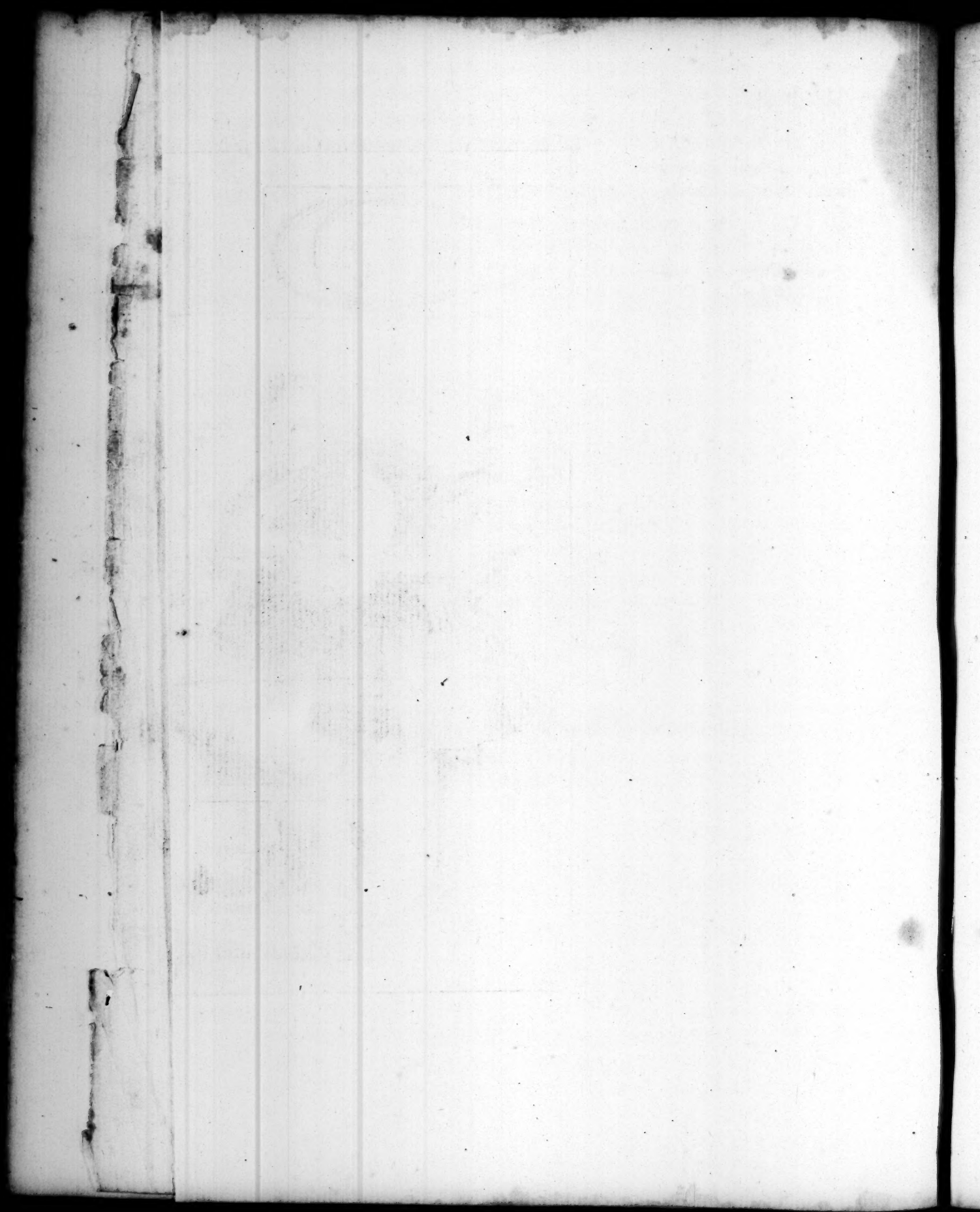


Fig: 3.



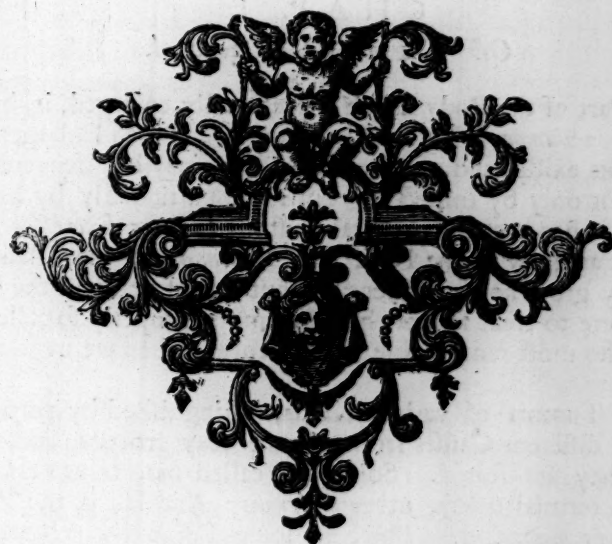




Arm; *cde*, is a strong Loop fastened to the Silk Ligature at *ff* so as to be moveable.

Fig. 9. Is another Kind of Supporter to be used in reducing the Femur, when luxated outwards: It differs from that represented at *Fig. 7.* being without the Aperture A in the Middle. B and C are the two Cavities, by which the Arms are fixed to the Machine.

Fig. 10. Is an Instrument recommended by PETIT for the Reduction of the Femur when dislocated inwards. It is to be fastened at FF in the Machine *Fig. 6.* instead of the two Arms *aa*. The Part A is applied to the *Os Ileum*, and the Part B to the Middle of the Thigh: But CC are fixed into the Machine *Fig. 6.* at FF.



INSTITUTIONS OF SURGERY.

PART I. BOOK IV.

Of TUMORS.

CHAP. I.

Of Tumors in general.

A Tumor
what,

I. **A**NY Part of the Body which is preternally enlarged, is, by Physicians, called a *Tumor*. But whether there be any such Enlargement, in what Part its exists, and of what Kind it is, may be discovered by examining the Parts, not only by Inspection, but more particularly by Feeling. And notwithstanding it has been the general Custom to refer *Excrescences*, as Warts, Corns, and such as grow in the Nose and *Pudenda*, to the Class of *Tumors*; yet because they grow not from beneath, but out of or upon the Skin itself, it seemed proper here to treat separately of Tumors, properly so called. We shall take Notice of the most remarkable *Excrescences*, when we treat of Chirurgical Operations.

Kinds of
Tumors,

II. There are Tumors of various Kinds, distinguished by particular Names, according to the different Causes from whence they proceed, and the particular Parts wherein they are seated. Some are called *hot*, others *cold* and *watery*; some again are termed *windy*, other *scirrhus*: And lastly, the Physicians call some *benign*, other *malignant*. There are some Tumors which are contained in a proper membranous Bag, and are therefore called *cystic*: And if this should be in an Artery, 'tis usually termed an *Aneurism*; but when in a Vein, a *Varix*. In the Veins of the *Anus* or *Rectum*, the Disorder is termed *Hæmorrhoides*: But if the Tumor be in the *Scrotum*, *Inguen*, or at the *Umbilicus*, it is generally called a *Hernia*. If any *Pus* or Matter is contained in the Tumor, it is then by the Surgeons termed an *Abscess*. Lastly, if the Tumor is seated on a Bone, Physicians usually call it an *Exostosis*.

Kinds of In-
flammation.

III. The forementioned Classes of Tumors are all of them generally subdivided into several other Kinds. Thus the hot and burning Tumors, which are the same with Inflammations, are generally termed *Phlegmons*, when violent, and seated in the common Integuments; but when slighter, they are commonly called

called *Furuncles*. The Inflammation which is not fixed deep, but spreads only superficially upon the Skin, is usually distinguished by the Name of an *Erysipelas*; and the inflammatory Tumor that arises at the Fingers Ends is termed *Paronychia*. When the Inflammation fixes in the Groins or Arm-pits, the Tumor is called a *Bubo*; but when under the Ears, *Parotis*. If a great Inflammation seizes the Hands and Feet from extreme Cold, *Chilblains* arise. Other Inflammations have also particular Names, according to the particular Part of the Body they possess. Hence, in the Writings of Physicians, we frequently find Accounts of an Inflammation of the Breasts, Eyes, Tonsils, Testicles, Arms, Feet, &c. And this may suffice for a short and general Account of the Kinds of Inflammations: The various other Sorts of Tumors we shall explain hereafter.

IV. Before we proceed farther into the Consideration and Treatment of Tumors, it will be first proper to take notice, that we do not intend here to handle all Sorts of Tumors to which the Human Body is subject, but only such as are external, and of the slighter Kind. We intend first to examine those Tumors only which are to be cured by manual Operation, and topical Remedies, and so come properly under the Business of Surgery: Neglecting at the same time such Tumors whose Cure is to be expected chiefly from the use of internal Medicines; as is usual in some internal Inflammations, *Scirrus's*, Dropsies, and the like. We shall also refer those Tumors which require Instruments and great Skill in their Treatment, to the Part of Chirurgical Operations: Such are *Herniæ*, *Ecreescences*, *Strumæ*, *Scrophulæ*, the *Paronychia*, *Cystic Tumors*, *Aneurysms*, *Varices*, *Hæmorrhoides*, and others. Our chief Concern here will be to treat of *Inflammations*, *Schirrus*, *Cancer*, *Œdema*, *Tumors of the Joints*, and other external Tumors. We begin with Inflammations.

CHAP. II.

Of a PHLEGMON

I. **A** *Phlegmon* or external Inflammation is, when any outward Part of the Body is preternaturally enlarged, and attended with a Burning Heat, Pain, Redness, Resistance, and a continual Pulsation and Pricking. Upon a due Consideration whereof, we may pretty readily perceive the Reason why the Disorder came to be distinguished by this Name. If we enquire into the proximate Cause of this Inflammation, we shall find it generally rises from too thick or viscid a State of the Blood, stagnating in the *Anastomoses* of the smallest Arteries and Veins: So that the Blood being sent in larger Quantities than it can pass through those Vessels, must of consequence excite the forementioned Symptoms, and must occasion great Disorder at every Part where such Stagnation is made. And though no Part of the Body, whether external or internal, nor the Bones themselves are exempt from this Kind of Inflammation; yet it more frequently happens in the Fat and Glands than elsewhere.

II. We just now observed, that the immediate Cause of this Inflammation was an Obstruction or Stagnation of the Blood in the smallest Order of Vessels. But if we enquire into the Causes from whence that Inspissation and Stagnation

What a
Phlegmon is.

Causes (1.)
external.

of the Blood in those Vessels proceeds, we shall, upon Examination, find them to be of two Kinds: Of which, the first Sort may be called external, and the latter internal. Amongst the *external Causes*, we place in the first Rank, all Wounds, Fractures, Luxations, Contusions, Punctures by Thorns and Splinters, with a too great Compression of the Vessels, whether by too strict a Bandage, or otherwise: Each of which obstruct the Passage of the Blood through its minute Vessels, by either dividing, bruising, compressing, or distorting them. To the fore-mentioned Causes we must add Burns of all Sorts, extreme Cold, too violent Motion of the Body, the external or internal Application of sharp and stimulating Substances, sticking Plasters, oily and fat Things, with Abundance of the like Nature, which stop up the invisible Pores of the Skin, and impede the free Course of the Blood.

(2) Inter-
nal.

III. Amongst the *internal Causes*, we reckon any thing acrimonious in the Fluids, as in the Scurvy: Because these so irritate, corrode, prick, and contract the very small Veins and Arteries, that the Blood is thence by degrees obstructed in them. But the same also frequently happens from the Blood abounding in too great Quantities, or being of too thick a Consistence; or lastly, when it circulates in the Body with too violent a Motion. For by this Means the grosser Particles of the Blood are drove, and, as it were, wedged into much smaller Vessels than they can readily find a Passage through; and this more especially when a sudden Cold is spread over a Body that is in a great Heat. In short, every thing will produce an Obstruction, which makes the Parts of the Blood too gross and bulky, or too much contracts the Mouths of the small Vessels.

What Share
an Acid and
Fermenta-
tion, have,
as Causes.

IV. As this is the State of the Case, with regard to the Causes of Inflammation, I think the Opinion of some modern Surgeons, who suppose the chief and sole Cause of the Obstruction to be an *Acid* in the small Vessels, appears to be very evidently erroneous. For besides their Inability to discover whether and where this Acid hides itself, it is very apparent from what we have here delivered, that great Obstructions may be brought on by a long train of very different Causes. The same may be said with regard to *Fermentation*, which has been so early patronised by many as a grand Cause in Inflammations and Obstructions: For there could never yet be found any such Fermentation in the Blood.

The Symp-
toms of In-
flamma-
tions.

V. We observed at § I. that an Inflammation was generally attended with Tumor, Heat, Redness, and Pain, and very often with a Resistance and constant Pulsation. To investigate the Causes of which Symptoms, we shall meet with no great Difficulty, if we strictly and accurately examine the Disorder itself. When the Blood is obstructed in its Passage through some of its smallest Vessels, it must necessarily move faster through the rest; for the smallest Arteries are never all obstructed, but in a *Sphacelus*. The general Consequence then must be, a swifter Circulation of the Blood through all its other pervious Vessels in the Body: Hence the Arteries must beat quicker, swell larger, and thence excite great Heat. When we find a Patient in this State, we say he has a small Fever; which is usually accompanied, for the first Days, with Thirst, Head-ach, Restlessness, and the other common Attendants of a Fever. If we bleed the Patient in this Case, when his Blood is cold, it appears covered with a tough, and whitish Crust or Skin, not greatly unlike the Skin of fresh Pork. As the Disease and Heat increase, each of these Symptoms become more violent: 'Till at last, the

the whole Mass of Blood being deprived of its most fluid Parts, is converted into a tough and glutinous Body, as will be more apparent from our Observations at the Operation of Bleeding.

VI. Inflammations terminate variously according to their different Degrees of Violence, the Causes from whence they arise, the Parts which they affect, and the particular Constitution of the Patient, with several other Circumstances, which also presage to us what will be the End of the Inflammation. But the several Ways wherein an Inflammation terminates, are chiefly four. It is either (1.) so dispersed and resolved as to vanish without leaving any considerable Injury in the Part affected, which afterwards recovers its former Vigour, and is of all the best Course it can take. Or else (2.) the Inflammation suppurates and degenerates into an *Abscess*, so as to leave ever after some Damage in the Organ. Or else (3.) the Inflammation degenerates into a *Gangrene* or *Sphacelus*. Or (4.) lastly, into a very hard Tumor, commonly called a *Schirrus*, which grows more compact in the Part affected as the Inflammation remits or goes off.

The several Ways by which an Inflammation terminates.

VII. As to the Resolution or *Dispersion* of an Inflammation, that is usually practicable when it is only of a milder Kind, in a sound Habit of Body, when the Blood is not yet too viscid nor vehement in its Motion. But *Suppuration* follows, when the Inflammation is more violent, the Circulation more rapid, but yet the Mass of Blood somewhat temperate, and without much Acrimony: That is, when the Blood becomes somewhat more inspissated, and its larger Particles sticking in the minute Vessels, can find no Passage; by which means the very small Vessels are distended and burst by the Pressure and Impulse of the obstructed Blood, so that their Contents are extravasated in the Fat, Flesh, and adjacent Parts. Upon this Extravasation the more subtile Parts of the Fluids putrify by the great Heat, they become foetid, acrimonious, and corrode all around them. The Fluids thus changed and corrupted, are then by the Surgeons called *Pus* or Matter: Of which there are several Kinds, according to its different Colour and Consistence; being either white, yellow, greenish, reddish, or party-coloured.

How it may be (1.) dispersed, or (2.) suppurated.

VIII. The Inflammation generally terminates in a *Gangrene* (which CELSUS and the Latins term *Cancrum*) when the forementioned Symptoms are much more violent, and when the Blood is at the same time more acrimonious and rapid than it ought to be. For, in that Case the small Arteries and Veins are corroded, and burst or broke: Hence all the adjacent Parts are dissolved and corrupted by the acrimonious and extravasated Humours, and particularly the Skin is very subject to be filled with Pustules, when its *Cuticle* has been separated, as in Burns. The *Sanies* contained in these Pustules and elsewhere, is usually termed *Ichor*; which is generally of a pale reddish Cast, being sometimes flesh-coloured, and sometimes brown or livid, which is the worst of all. For unless the Patient in these Circumstances be timely assisted, the forementioned Symptoms of Inflammation go off, the Tumor, Resistance, Heat, Redness, Pain, and Pulsation gradually disappear, and the afflicted Member grows flaccid and cold: It afterwards turns pale, becomes dead and insensible, and the Inflammation creeps to some other Part. If this Case should chance to be treated with Medicines too hot, astringent, cooling, fat, acrimonious, or narcotic; or if the Parts should be bound up too tight, the Flesh then quite dies, its Paleness turns to a livid or leaden Colour, sometimes resembling the Rind of Bacon. In the mean time the inclosed *Sanies* finds no Vent, becomes more acrimonious, and

Or end in (3.) Gangrene, or (4.) Schirrus.

so greatly corrodes the adjacent fleshy Parts, as wholly to destroy all Sense and Motion throughout the Limb; whereupon follow a *Sphacelus*, or entire Corruption of the Member. But if the inflamed Part be full of Glands, and the Blood very thick, glutinous, and inspissated; the small Blood-vessels are then so strongly stuffed up with the glutinous Blood, that they are compacted together, the Parts lose their Sensation, and are converted into a *hard* Tumor, which is thence called a *Schirrus*. This may be sufficient concerning the four several Ways wherein a *Phlegmon* may terminate: But it remains that we shew the particular Method of Treatment and Cure proper in each of those Stages.

Of the Resolution or Dispersion of INFLAMMATIONS.

In what a
Dispersion
thereof con-
sists,

IX. Though the Methods used to cure Inflammations may be various, according to the several Causes and supervening Symptoms, with other various Circumstances: Yet, as the Inflammation constantly arises from an Inspissation of the Blood in its smallest Vessels, the grand Intention of each of those Methods should be, to open such small Vessels as are obstructed, and to restore the Blood to its natural Consistence and free Circulation. This has been commonly termed Resolution or Dispersion. Therefore, whenever the inflammatory Signs, mentioned § V. are gentle, it is much the best Way speedily to conclude about dispersing it: The right Method of performing which, we are now going to lay down.

Removal of
the external
Causes,

X. If the Cause of the Inflammation is found to be external and obvious to the Senses, as Thorns, Splinters, the End of a Sword, Bullets, or any other foreign Body stuck in the Part; nothing can be more serviceable than to speedily and carefully remove whatever is lodged there, if it can be done with Safety. So also when the Inflammation proceeds from a too strict Bandage in Wounds, &c. or from a Luxation or Fracture; the first and principal Business is, to speedily relax the Bandage, or else to set the Fracture, or reduce the Luxation.

Treatment
of a slight
Inflamma-
tion,

XI. When the external Causes are once removed, the next Thing to be considered is, whether the Inflammation be mild, or violent. If mild, there is no occasion for Bleeding, or strong Purges: The End is generally answered, by applying Compresses, dipped in Spirit of Wine, with a little *Sal Ammoniac*, or Lime-water, and some Spirit of Wine camphorated, to the inflamed Part, and repeating them warm at proper Distances. Likewise Oxycrate, or Cabbage-pickle, or a Decoction of Wormwood, Southernwood, &c. in Wine or Sea-water, applied in the same manner, are of wonderful Efficacy in removing slight Inflammations.

Bleeding and
Purging to
be used,

XII. But where the Inflammation is violent, it is very useful to open a Vein, either in the Arm or Foot, and to draw off a large Quantity of Blood, proportionable to the Strength and Habit of the Patient; giving afterwards a brisk Purge, not one that heats the Body, but judiciously accommodated to the Age and Constitution of the Patient. Both these are very necessary here, and if the Symptoms do not remit and grow milder, they must be repeated at Discretion. But I would advise the Surgeon in this Case, where he can, to call in the Advice of some prudent Physician: Because it may be otherwise carried on to Excess, as many do among the *French*, or else not made sufficient to answer the Intention. The most proper Purges for these Cases, we have mentioned before (at

Book I.

Book I. Chap. XV. § XIV, seqq.) in speaking of Inflammations arising from Contusions. But in very mild Inflammations, or where the Patient is of a weak Habit, or has lost much Blood by a Wound, or any other Cause, Phlebotomy and even Purging itself seems to be quite improper. On the contrary, when the Inflammation is great, and the Patient strong, it is almost incredible of what great Service a prudent Administration of laxative and discutient Medicines may prove.

XIII. To resolve and attenuate the inspissated Blood in the small Vessels, exceeding great Benefit will be found by giving internal Medicines, which are watery, diluent, cooling, and attenuating; because Bleeding alone, which the *French* rely too much upon, is frequently insufficient, unless it be joined with a proper Regimen and Diet; by which means any Acrimony in the Blood may be mollified and taken off. But all Aliments which are of a difficult Digestion, such as are pickled or salted, with all Spices and fermented Liquors, or any thing else that may heat the Blood, are to be strenuously and altogether avoided. Such internal Medicines are most proper here to cool and qualify the Blood, as are commonly given with Success in continual ardent Fevers, or internal Inflammations, as the Pleurisy, Measles, &c. Such are the absorbent Powders of *Lap. Cancro. Conch. pp.* neutral and nitrous Salts, cooling and diaphoretic Mixtures and Julaps, made of distilled Waters, subacid Juices and Syrups, also thin Emulsions, made of the four cold Seeds. But the bezoardic and spirituous Tinctures prescribed and recommended by some in this Case, are so far from being serviceable, that they encrease the Inflammation in the Blood, and raise a new Fire.

Internal Medicines proper.

XIV. With regard to the particular Regimen and Diet, the most proper *Aliment* seems to be Broths and Drinks, made with Barley, Oats, or Flower, also Viper's Grass, Succory, Chervil, Sorrel, Lettice, Endive, Apples, and Vegetables of the like Nature; in the Decoction of which may be mixed the Juice of Citrons or Vinegar, to communicate a grateful Sharpness, and temperate the inflammatory Heat. Hence roasted Apples, or Cherries, and Plumbs boiled, are very wholesome for inflammatory Cases, where they sit easy upon the Stomach. The most proper *Drinks* are such as are thin, watery, and cooling, made of a Ptisan or Decoction of Barley, Oats, or Bread, and to give it a pleasant Taste, Apples may be used, or some acid Syrup. But when the Inflammation is violent, it will be proper to add a small Portion of Nitre^a. Of these may be drank plentifully in proportion to the Thirst and Heat: But Care should be taken not to let the Patient over-drink himself. Ale and strong Wine should be wholly abstained from: But if they are of the smallest Sort, and the Patient has a strong Desire for them, he may be gratified without any great Danger; especially if a Slice or two of a Citron be infused therein. Besides the foregoing, it may be not amiss, for Variety, to use Coffee and Tea, &c. If the Patient should happen to be of a cool and phlegmatic Habit, it may be not improper to add some of the milder Sort of Spices to his Drink, as Cinnamon, Sassafras, Mace, Anniseeds, and the like: Or the Patient may be ordered to infuse some proper medicinal Herbs in the Manner of Tea, or a very weak Decoction of Sassafras; the

A regular Diet to be observed.

^a HARRIS recommends the following Drink, as of great Service in Inflammations: *℞. Nitri ʒj. Pulv. Coccon. gr. xii. Aquæ Simp. ℥iij. Sacch. ʒj. m. f. Potio; Cujus bibat Ager. ʒv. vel vi. 3tia vel 4ta quaque hora.*

drinking

drinking of which will promote a gentle *Diophoresis* or Perspiration. For by this means whatever is glutinous in the Blood, will be readily attenuated and resolved, and the Blood will recover its free Circulation.

External
Medicines.

XV. Nor is there less Care required in the Application of *external Medicines*. For though some Physicians use nothing but heating Remedies, and others only cooling Medicines, to appease the Inflammation; yet both of them, when applied indiscriminately, may prove both useless and pernicious. For one Medicine is not to be applied to every Patient, but particular Remedies are to be suited to the Strength and Constitutions of particular Patients: Or else Injury might follow upon the Application of hot Medicines to hot Constitutions, and the contrary. I therefore look upon it to be Matter of Consequence to observe diligently, that cooling Medicines be applied to such as are of a hot Temperature. Among the Coolers, the principal are *Acetum Lithargyrifatum*, applied warm by Linen Rags folded together; or *Acetum calidum minio Bolove permixtum*; or *Oxycraturum ex equis aceti et aquæ portionibus confectum*. Of each of those Liquors may be taken, for Example, ℥vi . *Salis communis* ℥i . *Nitri vel Salis Ammoniaci* ℥ij . Let them be mixed, and applied to the affected Limb with Linen Cloths. Among the vulgar, common, or domestic Medicines, the *Stercus bubulum recens atque calidum aceto calidiori admixtum*, is an Application very easy to be had, and of no small Efficacy: Pickled Cabbage-leaves, Broth, Brine, &c. are also sometimes used with Success to the inflamed Limb. Some prefer cooling Plasters, as the *Emp. ad Ambusta, de Minio, de Lithargyro, Diapompholygos, Saturninum, &c.* These Plasters may do pretty well in the slighter Inflammations, for such Patients as have a good Opinion of Plasters; particularly they will do very well in the Night-time, when the Preparation and Application of Fomentations are difficult and troublesome.

Remedies
proper in
cold or
phlegmatic
Habits.

XVI. In cold and phlegmatic Patients, *Sp. Vin. rectificat. Sp. Vin. Camph. vel paxillo Theriac. permist.* are very successful in dispersing Inflammations, being often applied by means of hot Cloths: So is also the *Aqu. Calcis, vel Mera, vel cum Sp. Vin. Camph. Aq. Reg. Hungar. Bolo, Cerussa, Lap. Calaminari, Sale Ammoniac, aut Lithargyro permixta*. A Mixture of *Sp. Vin. ℥ij.* and *Sapon. Venet. vel Hispan. ℥ij.* being applied warm, gives place to hardly any Medicine for dispersing an Inflammation. Lastly, there are many Herbs proper for this Purpose, as *Scordium, Absinthium, Mentha, Sabina, Abrotanum, Matricaria Flor. Tanacetum, &c.* which may be discretionally made into a Decoction with *Aq. Sal-sa, Marina, vel Calcis*. With this Decoction may be mixed *Sp. Vin. Rect. vel Camph. & Sap. Venet.* by which means its Virtue will be increased. The fore-mentioned Herbs may be also commodiously boiled and made into a Cataplasm, and applied in the same Manner with the rest of the Medicines, *i. e.* by Linen Cloths folded together, and bound round the disordered Member.

External
Applications
how to be
made.

XVII. There remains one Thing to be especially observed, with regard to the Application of external Medicines in this Case: Namely, that each of them must be always applied hot, and never be permitted to grow first cold. The Inflammation also disperses generally much more speedily, when the disordered Limb is first rubbed well with a Cloth dipped in some warm discutient Fomentation, before any fresh Cataplasm be laid on. And this Method is to be continued, till the Inflammation be either wholly dispersed, or else brought to an End by Suppuration or a Gangrene.

XVIII. In the mean time the Surgeon should carefully observe, that the Apartment where the Patient lies be neither too hot nor too cold, but be kept as near as possible to the Degree of temperate Air, also to reconcile Rest and Sleep to the Patient, and to let him not be kept awake too long. Lastly, to let the Patient keep his Mind free from pernicious Passions, as Anger, Fear, Care, great Thought, &c.

What sort of Life the Patient should lead.

CHAP. III.

Of SUPPURATION and ABSCESS.

I. WE observed before, that the second Way in which an Inflammation went off, was, by Suppuration; that is, a Conversion of the inspissated Blood, and the soft adjacent Parts (as the small Vessels and Fat) into Pus or Matter: Which Disorder, when it has not yet found an Opening, is generally called by Surgeons an *Abscess*.

Suppuration what.

II. An Inflammation may be known to tend to Suppuration from the Signs beforementioned at Chap. II. § VII. which generally happens, when the Inflammation has been of long standing when the Surgeon is called in, or when it cannot be dispersed by the Use of the forecited Remedies.

Signs of Suppuration.

III. As soon as we find it tend to Suppuration, we must wholly lay aside the Use of resolving Medicines: And we must strive, (1.) to forward the Inflammation to Maturity, *i. e.* to convert the stagnating Blood into laudable Matter: Then (2.) to procure a Discharge or Vent for this suppurated Matter. (3.) To let the disordered Part be well cleansed from all that is corrupted. And lastly, (4.) to incarn, agglutinate, and heal the wounded Part.

What is to be done in Case of Suppuration.

IV. As to forwarding the Inflammation to *Suppuration*, that is to be promoted by particular maturing Remedies. Among which, the best seem to be such of the Emollients as obstruct the Pores of the Skin, as Fats, Oils, glutinous and slippery Medicines; as also the Application of sharp, pungent, and somewhat caustic Medicines, made up and used in the Form of a Cataplasm: Or Plasters of the like Kind may be applied to the disordered Part.

Maturation, how promoted.

V. Among the emollient Medicines for this Purpose, there are several Kinds of Herbs, Fruits, Seeds, and Meals that may be here enumerated: As the *Althæa*, *Malva*, *Lilia*, *Parietar. Verbasco*. *Branca Ursina*, *Solanum*, *Hyoscyamus*, *Ficus*, *Semen Lini*, *Fœnu-græci*, *ejusdemque seminis Farina*; *Farina item triticea aut siliginea*, *Panis primarii & secundarii Micæ*, *Vitelli Ovorum*, *Butyrum*, *Mel*, *variorumque animalium pinguedines vel adipēs*, *Oleum Lini*, *Olivarum*, *Liliorum albarum*, *Chamamel.* and many others of the like Kind. As to the other Class of Maturaters, which are sharp, pungent, and stimulating, but also emollient at the same time, there may be reckoned *Chamamelon*, *Melilotum*, *Cepæ sub cinere tostæ*, *Allium*, *Crocus*, *Terebinthina*; *variaque gummata*, *Galbanum inprimis*, *Ammoniacum*, *Bdellium*, *Opopanax*, *Sagapenum*, *in vitellis ovorum resolutum*; & denique *fermentum panis*.

Simple maturative Remedies.

VI. From a proper Mixture of the now recited Simples, may be made various and useful Cataplasms and Plasters for this Purpose. It may be not unacceptable here to instance a few of the most proper and efficacious of these compound Maturatives.

Compound Maturatives.

1. R. *Herb. Malv. Alib. Parietar. Chamæmel. aa Mj. Farin. Sem. Lini vel Fæ-nugræti ℥ij. Coq. leni igne aqua vel lacte, ad consist. Cataplasmatibus, postea add. Fermenti panis ℥ij. Gum. Galban. in vitell. ovi resoluti ℥j. Dein linimento-rum convolutorum adminiculo, calida, & quam sæpissime quidem supra læsum membrum deligantur. Vel,*
2. R. *Fol. Malv. Branc. Ursin. aa Mij. Caricar. Pinguium contusar. N° vj. His eadem, ut modo retulimus, ratione decoctis adde butyri recentis, nec non cepa-rum sub cineribus tostorum, aa ℥ij. & denique farinæ sem. lini, quantum qui-dem ad Cataplasma conficiendum sufficit, admiscendum. Vel,*
3. R. *Rad. Lilior. alb. ℥ij. Herb. Parietar. Mercurial. Melilot. aa Mj. Ficum recent. contus. N° vj. Hæc in aqua penitus concoquantur, admixtisque Gumm. Ammoniac. & Sagapen. in vitellis ovorum solutor. ut & aceti boni aa ℥j ℔. in Cataplasma quoddam convertantur. Vel,*
4. R. *Farinæ Siligineæ, aut Triticeæ M. ij. vel iij. coq. in s. q. lactis admisc. Gumm. Bdellii & Opopanacis cum vitellis over. subactior. aa ℥j. ut & Croc. ℥j. in Cataplasma transmutentur. Vel,*
5. R. *Fermenti panis ℥iij. Mellis ℥j. Saponis Veneti comminuti ℥℔. Olei Lilior. alb. q. s. F. super leni igne Cataplasma. Vel,*
6. R. *Mellis ℥iv. ad lentum ignem ex aqua decoquantur: His postea Olei Lini aut Chamæmel pauxillum, ut & Farinæ Siligineæ aut Sem. Lin. quantum ad ma-lagma parandum satis est, admisceatur.*

These Cataplasms, or others of the like Nature, are to be often applied hot to the Part affected, till the Matter within appears to be sufficiently digested or matured by the Softness and Whiteness of the Tumor. But when the Abscess is of the smaller Kind, it is every way more commodious to apply some maturative Plaster, as *Empl. Diachyl. cum Gumm. vel & Emplastrum ex melle & farina compositum.* These may be applied to the Part affected, till Suppuration ensues.

Internal
Medicines
proper to be
used.

VII. In the mean time, when the Patient's Condition requires it, we must be careful to temperate the Motion of his Blood, not by external Applications only, but also by internal Medicines and a proper Regimen. When the Blood moves too slowly, as may be known by the Pulse, the Patient should moderately use Meat, Drink, and Medicines which are warm and stimulating: By which means the inspissated Blood contained in the small Vessels may be the more easily converted into Matter, by the increased Motion of the Blood. Strong Broths, Wines, and Ale are also very effectual for the same Purpose. But where these are insufficient, and the Pulse indicates that the Motion of the Blood is still slower, it will be proper to order the *Theriaca, Diascordium, or Alkermes* to be taken a Bit upon the Point of a Knife several Times in a Day, or dissolved in Wine, Cinnamon Water, or some other Cordial Liquor. In the mean time we must not neglect the *Tinctura Bezoard. Essent. Alexipharm. Diaphoret. Essent. Cinnam.* with other warm cardiac and comfortable Essences, Spirits, and medicated Teas, by infusing a few Sassafras Chips, Red Sanders, Cinnamon, &c. But on the contrary, when the Motion of the Blood appears by the Pulse and great Heat to be too violent, then cooling Medicines must be directly ordered, to assuage and temperate the Heat and Motion, and to prevent a Gangrene.

To this Head belong all Sorts of thin and watry Drinks, with subacid Medicines and absorbent Powders with Nitre, as we mentioned in *Chap. II. § XI.* It is also sometimes proper in this Case to open a Vein, and bleed a little. Lastly, when the Strength of the Constitution is not impaired, but remains firm, and the Motion of the Blood and Pulse appear to be neither too swift nor too slow; unless there be some urgent Symptom, the Use of internal Medicines to promote the Suppuration, seems to be wholly unnecessary, if the Patient keeps up to a proper Regimen.

VIII. With regard to opening the Abscess and discharging its Matter, it is a Caution very necessary to be observed, that the Opening be not made too soon, before the Matter has arrived at a perfect Maturity. For else, the Discharge of the Matter will be not only impeded, but the Part will, in all Probability, be flung into a greater Inflammation. This has indeed been the common and constant Practice hitherto; but some of the Moderns (among whom is *GOUVEAUX a Frenchman*, p. 259. of his Surgery) will have it proper to open the Tumor directly, without waiting a Suppuration, if it cannot be quickly dispersed: Which I also find to have been the Advice of *CELSUS* (p. 408.) formerly. But to return, an Abscess is known to be sufficiently ripe, when the Tumor, which before resisted, feels soft and pliant; when it turns pale or of a yellow Colour; when, upon applying the Fingers, you perceive a Fluid to be lodged within; when the Pain, Redness, Heat, and Pulsation go off, wholly or in Part, and the Sensation of a Heaviness or Weight seizes the disordered Part in the room of the former. Yet sometimes there are Abscesses, as I myself have more than once experienced, when the Skin does not change its Colour; but on pressing the Tumor you perceive a Softness, and a fluctuating within. In these Cases the other Surgeons and Physicians were either doubtful of the Abscess, or flatly denied it: Nevertheless, when I opened the Tumor, there flowed out immediately a large Quantity of Matter. When the above-mentioned Signs appear, the Abscess must be opened in the most prominent and depending Part without more Delay: For Delay generally proves of a worse Consequence than opening it too soon, tho' both of them are bad. For when the Matter is retained longer than it should be, in a large Suppuration and nervous Part, there is Danger lest the corrupted Matter should corrode the adjacent Parts, and produce *Fistulae* or a *Caries* of the Bones; or by insinuating itself into the small Vessels, and corrupting such Parts of the Blood as it mixes with, it may excite ill-conditioned Fevers; or lastly, by disturbing the Functions of the Brain, Lungs, Liver, and Kidneys, it may bring on Inflammations and Suppurations, and at length Death itself. Sometimes the most subtle Part of the Matter perspires, and only the grosser Parts are retained behind, which gives Rise to hard Tumors, especially in glandular Parts. Since these must therefore be the Consequences, if the Abscess be not timely opened, the Surgeon's great Care must be to use the proper Opportunity, and to make an Opening by the usual Methods where the Skin appears to be the thinnest. The Methods for making this Opening are principally two, either by *Incision* with the *Scalpel*, or by making an *Eschar* with a *Cautic*.

IX. The Parts which are not suppurated are to be incised in the following Manner. The Surgeon is to grasp the Basis of the Tumor with one Hand, pressing the Matter outward towards the Skin, to avoid hurting any Vessels or

When the Abscess ought to be opened.

How the Incision is to be made.

Nerves in the subjacent Parts; he is then to make the Incision by the sharp Scalpel (*Tab. I. A or B*) in his right Hand; making the Opening in the softest and most depending Part of the Abscess, that the Matter may have the freer Exit. When the Abscess is large, the Scalpel is not to be taken out as soon as the Opening is made, but the Incision in the Skin is to be further enlarged with it; but with so much Caution as to avoid the larger Vessels and Nerves, with the Muscles of the subjacent Parts. The Abscess thus opened, the Putrid Matter is to be let out; and when it is glutinous and thick, it may be gently pressed forth with the Hands. But if the Quantity of Matter contained be very large, and the Patient not bold enough to bear the Knife, but faints away, which is often the Case; then the best Way seems to be, to discharge the Matter in Part, and fill up the Cavity with Lint: And after the Patient has been recovered by *Aq. Reg. Hungar.* or some other Cordial, to complete the Dressing with a Plaster, Compress, and Bandage, leaving the perfect Discharge and Cleansing thereof to the next Dressing. But if no *Deliquium* happens, the Matter may be all discharged at one Time. The remaining Treatment of this Ulcer is to be the same as we have directed before in Wounds. In the first Place, the Abscess is to be cleansed with Digestives: Afterwards Sarcotic or Balsamic Medicines are to be applied, till the Wound is filled up internally with new Flesh, and externally closed or cicatrized. Tents, particularly of the harder Kind, must be here cautiously avoided, as they generally produce Ulcers which are very difficult to cure. It is much safer to fill up the Cavity with Dossils of Lint, and to remove them once or twice a Day as there is more or less Matter.

How the
Matter may
be dischar-
ged by a
Caustic.

X. The other Method of opening an Abscess is, by means of a Caustic or corrosive Medicine; and is generally used for Children and such as are of a tender Constitution, who are very much affrighted at the Approach of the Knife or Scalpel for Incision. Among these caustic or corrosive Medicines, the most commendable and proper are, the *Lap. Caust. ex cineribus clavellatis & calce viva vel ex lixivio Saponariorum paratus*: Also the *Lap. Infernalis*, *Butyrum Antimonii*, and h like, of which there are such Abundance, that almost every Apothecary and Surgeon has now his proper Caustic, made after his own particular Method, which is supposed to excel the rest. The *Lapis Causticus* is to be applied to the Abscess either whole in the Lump, or else beat small, as may best suit the Occasion: But then a defensive Plaster must be first applied to the Abscess, perforated with an oblong narrow Aperture, much as we have delineated in *Tab. II. Fig. 11.* For thus a proper Provision is made against the spreading of the Caustic beyond its due Bounds, making its way through the Skin only in a small or narrow Compass. Over the Caustic is to be applied a Compress of Lint or Linen, over the Compress a large Plaster, and over the Plaster a still larger Compress of Linen: And to keep all on firm, a proper Bandage must be applied. Things being thus managed, the Patient is to compose himself to rest for a while, and the Dressing should not be taken off from the Abscess for the Space of several whole Hours. Three Hours is the least, but sometimes it requires four, five, or six Hours to make an Outlet to the Matter by Caustics, in Proportion to the Thickness of the Skin and Strength of the Medicine. When the Caustic is judged to have remained long enough upon the Abscess, the Dressing must be then taken off, that the noxious Matter may be discharged: But if

if the Caustic has not sufficiently penetrated, the Opening may be forwarded and enlarged by gently applying the Scalpel, Probe, or Spatula, that all the Matter may have a free Passage. But as soon as the Caustic has made an Eschar or Crust, it must be mollified by applying *Bulyrum recens, Ung. Digest. vel Balsilic.* to be retained by a Plaster and Bandage. When the Eschar is found loose or separated, the rest of the Treatment must be the same with that we mentioned before, in opening the Abscess by Incision. But to say Truth, without Dissimulation, I must acknowledge it my Opinion and Advice, that the Knife is greatly preferable to the Caustic, as being more neat, expeditious, and safe, and the Aperture heals with a smaller and neater Cicatrix: So that most prudent Surgeons do, with Reason, always propose the Knife before a Caustic, using the latter only in Cases of great Timidity, and where the first cannot be conveniently admitted.

XI. That our Reader might not be at a Loss for the Composition of the *Lapis* The Caustic how prepared. *Causticus*, we thought it would not be amiss here to lay down a short and approved Method of making the same. *R Ciner. Clavellat. & Calc. viv. fortiss. aa ʒvj. vel. Ciner. Clavellator ʒj. Calcis vivæ ʒvj.* These being pulverised separately^a, and afterwards mixed together in a large Glass, or Earthen Vessel, are there to be dissolved in a good deal of Water, letting them stand an Hour or two to melt perfectly. Then the Liquor with what it has dissolved, is to be filtrated through a Linen Cloth from its gross Sediment, evaporating it afterwards in an Iron Pan over the Fire. The consistent Mass, left after Evaporation, is to be put in a Crucible, and melted with a strong Fire, so that it may flow like Oil. It may then be cast into a Mortar or broad Pan, and either cut or beat into small Pieces before it is quite cold, which are to be put into a Glass very close stopped, and preserved in a dry Place for Use. When an Abscess is to be opened, a sufficient Quantity of this is to be taken and applied, either whole or in Powder, and bound upon the Skin, as we observed before. If the Caustic be wetted, it generally acts a great deal sooner, so as to corrode the subjacent Parts, and make an Eschar in an Hour or two. But when it grows old, by long keeping, it commonly loses its Force, so that at length it cannot corrode at all. Other and no contemptible Method, of preparing this Caustic may be seen in the Chemistry of LEMERY, in the *Leyden Chemical Collections*, and the Surgery of DIONIS, *Edit. 2. p. 709.*

CHAP. IV.

Of TUMOR and INFLAMMATION in the BREASTS.

I. **W**E have been hitherto treating of Suppuration. Our next Business What happens in an Inflammation of the Breasts. was to have proceeded to a Gangrene: But as there are several Kinds of Inflammation and Suppuration which do not commonly terminate in a Gangrene, it was proper first to treat of these separately, before we came to the Consideration of a Gangrene. We begin with those Inflammations which

^a BOERHAAVE, in his *Materia Medica* Sect. 412. takes *Ciner. Clavell. ʒiv. Calcis vivæ ʒvj.* and uses another Method of Preparation, which did not succeed with me. You will find a more compendious Preparation of it in the *London Dispensatory: Ex Calcis vivæ ʒj. Cinereum Clavellat. ʒj.*

usually

usually afflict the Breasts, being a Disorder most incident to Child-bearing Women, and almost constantly happens in a few Days after their Delivery. If the Milk should be impelled into the Breast too plentifully and forceably, which at such Times frequently happens, and if the Mother should then be seized with great Cold, Fear, or Anger, the sanguiferous and lactiferous Vessels being thence obstructed, the Breasts must then become inevitably tumified, and at the same time they will be afflicted with great Heat, Redness, Resistance, and violent Pain. The same Accident sometimes happens to Women that give suck, even a long Time after their lying-in: Which proceeds from the same Causes which we just now mentioned; and is also sometimes the Case of those who have no Milk. I have even observed the same Case in a Man of a weak Habit, which arose from a great Fright: One Breast was vastly tumified, and turned to an Abscess, from which, upon the first Opening, I extracted above two Pounds of Matter, to the great Surprize of the Patient and the By-standers. This Kind of Inflammation is usually attended with a Fever or great Heat all over the Body, followed with a quick Pulse, Thirst, Head-ach, and difficult Respiration: And this in such a Manner, that a Shivering generally proceeds in its Invasion.

The Causes
of an In-
flammation
in the
Breasts.

II. The general Causes of Inflammation in the Breasts of Child-bearing Women, are usually, as we hinted before, a sudden Cold taken when the Body is very hot or in a Sweat, cold Drink, Anger, Fear, Grief, and any other violent Perturbation of the Mind, from whence the Blood and Milk may become inspissated and obstructed in the small Vessels of the Breast. And tho' the Inflammation of the Breasts happens most frequently in Women, especially such as have lately lain in, and either will not suckle the Infant or cannot; or when the *Fœtus* died in the Womb, or soon after the Birth, in which Cases it proceeds from the Stagnation of the Milk brought on by Fear and Grief: Yet it may frequently happen from the same Causes in such as have left off giving suck for a considerable Time, as also from a Blow, Contusion, or some other external Injury of the like Nature.

The Differ-
ence of
these In-
flammations.

III. These Inflammations do not always happen to be equally intense and violent: For sometimes it seizes the whole Breast, sometimes only one Side, and greatly tumifies it with violent Pain: But then again, at other Times it occupies only a small part of the Breast. In one Patient the Inflammation lies very near the Skin; in another spreads very deep. At one Time the Inflammation has very urgent Symptoms, as violent Pain, Heat, Redness, and Tension; but at other Times it sits very easy upon the Part.

Prognosis.

IV. He that is desirous to be an able Presager in the Events of this Kind of Inflammation, should first carefully consider the several Symptoms of the disordered Part now mentioned. For as the Tumor is less, and the Inflammation and Fever slighter, the more gentle and happy is like to be the Consequences, and the less is the Danger. For in that Case there is room to hope it may be dispersed, without coming to Suppuration. But on the contrary, the more violent the Symptoms, the greater is like to be the Suppuration: Sometimes it turns to a *Scirrhus*, and a *Scirrhus* commonly ends in a Cancer of the Breasts.

Inflamma-
tions of the
Breasts, how
to be treated,

V. This Disorder may be very readily prevented in Women of Condition, and such as cannot, or will not, suckle their Children, if some of the *Emplast. de Spermate*

Spermate Ceti spread on Linen be applied warm all round upon the Breast soon after Parturition, being perforated in its Middle to transmit the *Papilla* or Nipple; the Accession of the Milk being also repelled by a pretty strict Bandage. It may be also not improper in this Case to hang the *Galactites*, or some *Argentum vivum* inclosed in a Nutshell, about the Patient's Neck, down the Back; and to apply *inter Scapulas Emp. ex Spermate Ranarum, Saccharo Saturno, Oleoque Hyoscyami permixtum*. Among the internal Medicines, the most proper are such as bring down the *Lochia Puerperarum*, when they do not flow in sufficient Plenty of themselves. The principal for this Purpose are *Essent. Myrrhæ, Succin. Essent. Croc. Elix. proprietat. &c.* taken now and then in a proper Dose. Lastly, with respect to the proper Diet, it must be carefully observed to diminish the Quantity of Milk by the Smallness and Poverty of the Meat and Drink. Upon which account the Patient should be recommended to drink nothing but small Broth, Tea, or the like watery Liquors, for many Days together, 'till the Afflux of Milk to the Breasts is found to be sufficiently weakened. But if the lying-in Mother be desirous of suckling the new born Infant herself, there can be no better Preservative for her against Inflammations of the Breasts, than to keep free from Colds, and to cautiously avoid all violent Affections of the Mind, letting the Child suck frequently at proper Seasons to prevent the Milk from Stagnation. Besides this, Care must be taken to use Plenty of small Broth and thin Fluids for the first Week or two: By which means the Milk will not be so abundant, nor apt to be inspissated in the lactiferous Ducts of the Breasts.

VI. But when Inflammation and Tumor have already fixed themselves in the Breasts, the Surgeon's principal Business is, to use all Endeavours to discuss whatever stagnates in the small Ducts and Vessels with the utmost Expedition, both by internal as well as external Medicines; in order to prevent the Tumor from running into Suppuration or a *Scirrhus*. For when it suppurates, there generally remains an ugly Cicatrix, which is very disagreeable to most Women, but especially the more noble and elegant. As to the internal Medicines proper to be given to Childbed Women, to disperse Tumors in the Breasts, which are generally accompanied with a Fever, I would advise the Surgeon and Patient to consult some prudent and skilful Physician on that head: Lest the lacteal Fever (as it is generally called) carry off the lying-in Patient under an injudicious Treatment.

VII. As to the external Remedies, in which the Surgeon ought to be particularly skilled, the strongest discutient that I have frequently found to excel others for these Tumors, is, the *Emplastrum ex Spermate Ceti præparat*. In the mean time it may be of some Service to lay over the Plaster a discutient Bag, made warm and stuffed *ex Furfure ac Sale, vel Flore Samb. Chamæmel. Melilot. Lavend. vel ex Sem. Fæmin. Cumin. Anis. &c.* There are some who put Lambs Skin over the Plaster instead of discutient Bags. Which not only defends the Breasts from external Cold, but is also no improper Discutient for what stagnates in them. But there is still a usual and very effectual discutient Application for these Tumors, which is a Calf's Bladder filled with a warm Decoction of *Flor. Samb. & Chamæm.* in Milk, which is to be often applied to the Breast, its Warmth being renewed as it is impaired. Of nearly the same Virtue is the *Emp. Diacbyl. simp.* either alone or mixed with *Emp. de Sperma Ceti*. The Rob. Sambuci

Cure, (i) by
Dispersion.

External
Resolvents.

Sambuci or *Tberiacæ* mixed *cum Sale Absinthij*, being spread upon Linen, and applied in the way of Liniment, prove of great Efficacy in dispersing these Tumors, especially if they are applied warm, and covered with warm discutient Bags: But they are hard to be put up with among the rich and very nice Women, because they usually dawb the Skin, Cloths, and Bedding. To these we may add the use *Acet. Lithargyr. Acet. cum Semine Carui, Aq. Cateis*: Which are of very easy and considerable Use; being applied to the Breasts by means of Linen Compresses dipped in the Liquors while hot, and often repeated. A great many esteem it a ready and effectual Remedy to express the Milk upon burning Coals; nor do I think it proper to rashly reject this Method as wholly useless. For though this Sort of Cure seems to be sympathetical and superstitious; yet as it may excite a strong Imagination of drying up the Milk in the superstitious Woman, and that Imagination may have a considerable Influence, we see no sufficient Reason entirely to condemn it. But if the Breasts are internally very much distended with Milk, it will be proper to discharge it by the sucking either of an Infant, an old Woman, or a Puppy, or else by the Application of a Glass Instrument which we shall hereafter describe. The Milk should be thus discharged till the Tumor subsides and the Pain vanishes.

(2.) by Sup-
puration.

VIII. But when the Inflammation is greater than can be dispersed in the Space of four or five Days; or when, as it frequently happens, the Surgeon is consulted too late; the best way is to forward it to Suppuration as fast as possible, rather than hazard its turning to a *Scirrhus* or Cancer by Delay. If therefore the noxious Matter be not arrived at a State of Maturity by the use of the discutient Medicines, in order to accelerate the Suppuration there ought to be a speedy Application of an *Emp. Diachyl. cum Gummi.* or *Emp. de Hyoscyamo.* But more effectual Cataplasms are to be also made use of to digest the Matter, some of which we mentioned in the preceding Chapter, § 5 and 6. and others we shall also propose here. As,

1. *R. Farinæ Siligin. ℥℥ vel ℥j. Mellisque quantum ad Cataplasma conficiendum sufficit. Tum lactis & Croci paucillum admisceatur, calisactumque in patella quadam lineamentis obducatur, mammisque superimponatur, ac sæpius postea renovetur. Vel,*
2. *R. Farinæ Siligin. ℥iv. Gummi Galbani vitello ovi resoluti ℥j. Aceti ℥iij. his aquæ tanta portio admisceatur, quanta Cataplasmati coquendo sufficit. Vel,*
3. *R. Fermenti Panis ℥ij. Mellis ℥℥. Saponis Venet. comminuti, & Olei Chamæ-
ana ℥ij. quæ sibi invicem commixta in patellam conjiciantur, atque igni admota in puliculam sive malagma convertantur.*

How the
Abscess is to
be opened.

IX. These Cataplasms are to be applied hot, and very often, to the Breasts; keeping them on by Linen Compresses or Bolsters, the better to retain the Heat, till the Tumor breaks of itself, which it often does in this Part, from the thinness of the Skin: Or else, when ripened, it may be conveniently opened by the Scalpel. But the Incision ought always to be made in the lower Part of the Breast, unless Necessity obliges it to be otherwise, lest there should be left a visible Cicatrix after the Cure. Though there are not wanting some Surgeons who use the Caustic for opening Suppurations of the Breast, yet, as they usually occasion indecent Cicatrices, we think the Knife is greatly preferable to such Medicines.

X. After

X. After the noxious Matter has been discharged from the Breasts, the rest of the Treatment is to be the same with what we proposed in the Cure of other Wounds and Abscesses. The Ulcer is to be first cleansed with some digestive Ointment, and afterwards healed with some Balsam, as the *Peruvian* for Example; with Oil of Eggs and Wax. But when the Suppuration has run very deep, the best way is to inject the Wound with a cleansing Decoction of the *Sanicula* or *Alchimilla* mixed with a little *Mel Rosarum*; and to prevent the Lips of the Wound from closing, before the Bottom is filled up with new Flesh, it will be proper to introduce a soft Tent, or some scraped Lint. As the new Flesh grows up from the Bottom, the Tent may be gradually lessened or made shorter; and, at last, wholly removed when there is little or no Occasion for it.

XI. But it sometimes happens that Tumors in the Breasts of Child-bed and suckling Women will neither yield to Dispersion nor Suppuration, but will retain their ill Condition for the Space of several Months or Years. If this happens in young and healthy People, it occasions little or no Disturbance to the OEconomy: Nor is there great Danger of the Tumor's turning to a *Scirrhus* or Cancer, which the poor female Patient is often vastly afraid of. The Surgeon's Business here is to take Care to keep the afflicted Patient in good Heart by his Persuasions: And to the Tumor itself is to be applied *Emp. de Spermate Ceti cum Pauxillo Camphoræ, vel Diasapon cum Camphorâ*, to be constantly kept on, and the Breast must be carefully defended from the external Cold; by which means Tumors of long standing have grown gradually less, and at last vanished. But the Case is usually otherwise in Women, who are advanced in Years, and of a melancholy or sorrowful Disposition: For in such there is great Danger of the inveterate Tumor turning to a *Scirrhus* or Cancer.

Treatment
after the
Discharge of
Matter.

What is to
be done
when the
Tumor can
be neither
dispersed nor
suppurated.

CHAP. V.

Of INFLAMMATION in the TESTICLES.

I. SOMETIMES an Inflammation and Tumor happens in one or both of the Testicles: Which, if it be any thing violent, generally tortures the miserable Patient with most sharp Pains.

II. This Disorder may arise from two Causes: Either from some great external Violence, as by a Fall, Blow, or Contusion; to which some are liable from mounting a Horse with too much Haste and little Thought: Or from a venereal Cause; chiefly when some of the venereal *Virus* inspissates the *Semen*, and obstructs its Course through the small *Tubuli* of this Gland.

III. An Inflammation of the Testicle is distinguishable from any other Disorder in these Parts, and particularly from a *Hernia Scroti*, when the Patient has previously suffered any of the Causes § II. and complains of a great Swelling, Heat, Redness and Pain in his Testicle, the same being confirmed to the Surgeon by Inspection: His Feeling will also acquaint him with the Nature of the Disorder: For, upon applying the Hand, one or both of the Testicles are found to be swelled considerably larger than they ought to be, exceeding sometimes the Size of one's Fist.

Inflamma-
tion does
sometimes
happen in
the Testicles.
The Causes
of Inflam-
mation in
the Testicles,

Diagnosis.

E e

IV. This

Prognosis.

IV. This Disorder is not of so slight a Consequence as is generally thought ; for it very frequently turns out so as to deprive the Man either of his Life or Virility, by degenerating into an Abscess or *Sphacelus* : Or else it turns to a *Scirrhus* or Cancer, which have also Death for their usual Consequence : Or, lastly, it is followed by a *Sarcocoele* or *Hydrocele*, which are little less troublesome and fatiguing to the Patient.

Cure by Dispersion.

V. The same external Medicines will serve to resolve the Inspissations which happen in an Inflammation of the Testicle, which we before opposed to Inflammations in the Breasts : And above others we prefer *Acet. Lithargyrifat. Aq. Calcis cum Sp. Vin. Camph. cerussa, tutia, Lap. Calamin. permixt. vel & Farin. Fabarum cum Acet. Decoct. in Cataplasma*. But in the Night-time, when the Application of Fomentations is not so convenient, it will be proper to apply *Emp. de Ranis cum duplici Mercurio, vel Emp. Diachylum*. Nor are internal Medicines to be here neglected : For, if the Tumor arose from some external Violence or an Inspissation of the Blood, he should often take of the *Pulv. ex Lap. Cancror. præp. Test. Ostreor. Mat. Perlar. Cinnab. Arcan. duplicat. &c.* together with thin Drinks, as Tea, Decoctions of the Roots, Woods, and discutient Herbs. Plentiful feeding, Things which heat the Blood, and Aliment of difficult Digestion are to be carefully avoided. And if the Inflammation should be of the more violent Kind, it will not be amiss to mix a little Nitre with the forementioned Powder ; and to drop some *Sp. Vitriol. Sulphur. &c.* into his Drinks ; not neglecting to open a Vein in plethoric Habits.

Treatment when from a Venereal Cause.

VI. If the Disorder take its rise from some venereal Taint, it seems necessary to administer good brisk Cathartics, always adding a Quantity of *Merc. Dule.* to them : At the same time such other Medicines should be used as are calculated particularly against the Venereal Disease itself. Warm Drinks made of Tea, or a Ptisan of Barley, Liquorice and Anise boiled in Water must not be here neglected. By taking these, the Blood usually becomes temperate and attenuated, and the Tumor frequently dispersed.

How a Suppuration is to be managed.

VII. Lastly, if the Surgeon be called in too late, or if the Inflammation prove so violent not to give way to the preceding Remedies for Dispersion, a Suppuration or Gangrene is generally the Consequence. Therefore the Application of the same maturing Remedies will be here proper, which we proposed in the preceding Chapter for an Inflammation of the Breasts. And when the Matter is sufficiently digested, and the Abscess does not soon break of itself, it will be proper to open it carefully by Incision. The Matter being discharged, the Wound is to be first well cleansed by some digestive Ointment, injecting some strong spirituous Fomentation which resists Putrefaction, and at last healing it with some vulnerary Balsam. But first, to digest the Matter, and mitigate the Pains, it is found extremely serviceable to apply *Emp. de Hyoscyamo, vel Diachyl. cum Gummis* ; which are also strongly recommended by LUDOVICUS in his *Chirurgical Works, pag. 718*. While these Applications are properly used, we must strive to extirpate the Venereal Disease itself. And notwithstanding in many of these Cases, the *Scrotum* happens to be consumed so as to leave the Testicle quite bare ; yet the Loss of Substance in the *Scrotum* may be generally restored again, by a proper Treatment with digestive and balsamic Remedies, as I myself have frequently seen.

C H A P.

CHAP. VI.

Of an ERYSIPELAS.

I. **A**N *Erysipelas* is an Inflammation seated in the exterior Part of the Skin <sup>An Erysipel-
las, what it
is.</sup> and *Membrana Adiposa* beneath it, which wanders and spreads sometimes to a very great Extent, being accompanied with great Redness, Heat, and often Pain. Upon pressing the Part afflicted with the Finger, it looks white; but upon removing the Finger it turns red again. This Inflammation has been observed to fix itself ofteneft upon the Arms or Legs; but sometimes it seizes the Head, Neck, Shoulders, and Face^a; often the Nose, and some other Parts. It generally seizes the Patient with a *Horror* or Shivering, after which a great Heat arises, equal to what is usually felt in burning Fevers; and hence it has been distinguished, as well by the Antients^b as Moderns, by the Name of *Ignis Sacer*, or *St. Anthony's Fire*.

II. Any Cause that can produce other Inflammations may also occasion an *Erysipelas*: More especially exposing the Body to sudden Cold, when it is in a great Heat or Sweat; an obstructed Perspiration, the drinking too much fermented and spirituous Liquors; a Surfeit, or over-feeding; and lastly, a hot and sharp State of the Blood. From all which, either asunder or together, the Blood may be easily inspissated, the small Vessels contracted, and an Obstruction, with its consequent Inflammation, be brought on. <sup>Causes of an
Erysipelas.</sup>

III. With regard to the Event of this Disorder, it is observed that there is no great Danger, when the Inflammation is but small and properly treated. On the contrary, when the Inflammation is violent, the Habit of the Body ill and infirm, the Diet and Way of Life irregular, or the Part affected exposed to cold, neglected, or improperly treated; it is no Wonder if the Inflammation turns to an ardent Fever, an ill-conditioned Exulceration, Gangrene, or *Sphacelus*. But an *Erysipelas* is more particularly dangerous, when treated with external Applications which are cooling, fat, or oily; and when internal Medicines are taken which heat the Blood, whether Wine, Cordials, Spices, or the like. ^{Prognosis.}

IV. In order to cure an *Erysipelas*, the grand Intention is, to dilute the inspissated Blood, and divide it where it stagnates and obstructs. To effect which, there seems to be no better Way than that of giving Plenty of thin watery and warm Drinks, by which, a gentle and lasting Sweat may be excited. For by this means all Viscidities in the Blood will be diluted, any Acrimony will be tempered, and what hesitates or obstructs will be resolved: And lastly, the useless and corrupted Part of the Blood will be ejected by the invisible Pores of the Skin; by which natural Transpiration, the *Erysipelas* will be happily carried off as by an instant Remedy. Heating Medicines of all Kinds, especially the *Tinct. Bezoartica Aq. Epidem.* and other such strong, heating, and spirituous Medicines, are, in my Opinion, wholly foreign and improper for this Cure; because the Inflammation is generally more increased than abated by the <sup>Internal
Treatment.</sup>

^a An Example of an enormous *Erysipelas* in the Face and Eyelids, which lasted two Months, may be seen described by VERDUE on Bandages, Chap. III. and another exulcerated *Erysipelas* in both the Thighs is observed by SCULTETUS, *Obs.* 92.

^b CELSUS, *varius in locis.*

Use of them. On the contrary, Medicines which are temperating and moderately cooling, are here much more safe and useful: Particularly Preparations from Elder, as *Rob. Sambuc. ʒss. vel Cochlear. j.* diluted in *Aq. Flor. Samb.* In the mean time may be used Tea, Coffee, or a Diet Drink of Physical Herbs. The Patient's Body is to be carefully defended from the external Cold, and to be kept in a gentle and constant Sweat. When the Patient is troubled with great Thirst, he may drink thin Barley Gruel, and for Variety, a little warm Small Beer; for the Main of the Cure generally depends upon moderate Warmth and small Drinks. But if the *Rob. Sambuci* should not be liked by the Patient, some Diaphoretic Powder may be given in its room, or together with it, made of the *Tessacea, Antimon. Diaphoret. cum Nitri portuuncula*, in order to excite a gentle Sweat: But then the warm thin Drinks should not be neglected in the mean time. Lastly, the Regulation of the Non-naturals proper here, we suppose to be sufficiently evident from what we have already said of Inflammations in general, *Ch. II. N. XIII, &c.*

External
Treatment.

V. If the Inflammation in an *Erysipelas* should be but slight, it may then be often cured only by external Warmth: But when violent, external Warmth will not be of itself sufficient, without the Application of Medicines. The disordered Part is therefore to be covered with *Rob. Sambuci*, spread on blue Paper or Linen, over which are to be laid warm Cloths, or discutient Bags, as we proposed before in Inflammations. But the Use of the *Rob.* as well as the *Tberiacæ cum Sale Absinthii* is seldom complied with, because of their Uncleanliness, though very effectual in mitigating Inflammations, as we observed under Inflammations of the Breasts. Upon which Account, the Use of discutient Powders is much more frequent: Among which, the following seems to have the Preference composed *ex Flor. Samb. Glychyrrhizæ contrita, Creta præparata, Cerussa item ac Myrrha, aa admixtis cum pauxillo Camphoræ.* This is to be applied to the Part between soft blue Papers or Linen Cloths, over which are to be put little warm Bags. To this we may add the *Pulv. contra Erysipelas Mynsichti*, which is very efficacious though not much used amongst the Apothecaries. Lastly, we need not say much here of the green internal or middle Bark of Elder, whose eminent discutient Virtue in Inflammations is almost known by every body, and has been this long Time confirmed by constant Experience.

A Caution
concerning
an Erysipe-
las.

VI. Notwithstanding there are some who judge liquid Medicines wholly improper for the Cure of an *Erysipelas*; it must yet be allowed, that *Sp. Vin. Camph.* used warm, either alone, or mixed *cum Croco vel Tberiacæ* applied warm with coarse Paper or Linen Rags, are of very great Service here. Nor can I pass by a Mixture, which I have frequently experienced in this Case, *ex Aq. Calc. viv. cum Sp. Vin. Camph.* SCULTETUS (*Obs. 94.*) greatly extols the following liquid Remedy against an œdematous *Erysipelas*; he asserts, that he never found any thing answer like it:

℞ *Lixiv. mediocr. ex cinerib. vitis ℔j. Nitri ʒj ss. Salis commun. ʒj. Aceti vini opt. ʒj. M.*

Universals being premised, this Mixture may be applied to the Part affected by means of double Compresses warmed and retained on with Bandage; by which means it has surprizingly dispersed, in three or four Days time, such large

Tumors of this Kind, as have threatened a Gangrene. In the mean time, other liquid Medicines which are over acid, and almost all Obstruents and Astringents; together with fat and oily Things, should be cautiously avoided. For it can scarce be imagined how vastly these stop up the Pores, and by hindering the Blood from throwing off its Feculencies by Transpiration, fling the Patient into imminent Danger.

VII. Bleeding and Purging seem not to be so necessary in an *Erysipelas* as in a *Pblegmon*. For whatever is corrupted of the Juices in an *Erysipelas*, as it lies near the Skin, seems to be much more easily dischargeable by Sweat. But when the Heat is too great, the Pulse too high, and the Blood too abundant, Bleeding in that Case cannot but be judged proper. But to keep the Bowels open, Glysters seem preferable to strong Purges.

VIII. It here frequently happens that an *Erysipelas* comes to Suppuration; from whence usually arise the very worst of untractable and spreading Ulcers. When this is the Case, the Ulcer is always to be carefully cleansed, and dressed with *Ung. Saturnin. vel de Lithargyro vel de Cerussa, una cum Emplastro Saturnino*, to temperate the Acrimony of the *Serum*. But it is also at the same time proper to take such internal Medicines as will temperate and sweeten the Blood, using sometimes such as discharge sharp Humours by Stool: And lastly, a strict Regimen of Diet must be observed, till the Ulcers are healed again, which is even then a very difficult Matter to effect; especially when seated in the Legs of old cachectical or valetudinary People. See SCULTETUS on this Head, *Obs.* 90.

CHAP. VII.
Of a FURUNCLE, or BOIL.

I. **A** BOIL or Furuncle is a small resisting Tumor, with Inflammation, Redness, and great Pain, arising in the *Membrana adiposa* under the Skin. As there is no Part of the Body free from being the Subject hereof, so the whole is sometimes so miserably infested with them, that the Patient can hardly tell how to stir himself, or on what Part to lie. Not only adults, but also the younger, even new born Infants are obnoxious to this dreadful Disorder, which occasions in them most fatiguing Clamour and Restlessness.

II. The *Signs* proper to a Furuncle we suppose to have been sufficiently evident in what we but now proposed concerning its Nature. And although it be apparent from what has been said, that there is no great Danger in this Disease, when it happens to adults; yet it sometimes happens, when they are very numerous in tender Infants, that they excite not only violent Pains, Restlessness, and Tossings, with Weakness, Convulsions, and Epilepsies, but at length even Death itself follows. Indeed most of the bad Symptoms that attend Boils, as in all other Inflammations, are owing to a thick and viscid Blood. The more glutinous therefore the Patient's Blood is, the more Boils will infest him, and those of worse Consequence.

III. With:

Cure.

III. With regard to the Cure, it seems to consist chiefly in restoring the inspissated and stagnated Blood to its former Circulation and free Motion, and that as soon as possible, by proper Remedies. If the Boils are few in Number, they are seldom treated with internal Medicines, the Means generally used being only external Remedies. But when they are very numerous, or return again, it is necessary to use internal purging Medicines, and such as attenuate and cleanse the Blood. So that in adult Patients it seems proper to bleed both by the Lancet and Scarification, with Cupping: At the same time a strict Regimen of Diet should be used, drinking frequently and plentifully of a Decoction of the Woods, and such like Attenuaters of the Blood: The Patient should also entirely abstain from drinking fermented and spirituous Liquors, particularly Wine and its Spirit, and from the too frequent Use of Tobacco.

External
discutient
Remedies.

IV. When the Disorder is recent, external Medicines only will frequently suffice for the whole Cure, if the Patient observe a strict Regimen. For this Purpose the following Mixture is of great Service, made of Honey acidulated with Spirit of Vitriol, till the Mixture has acquired a considerable Sharpness, which is then to anoint the Furuncles. Of no less Virtue is the frequent touching them with mere *Spirit. Vitriol. aut Sulphuris*. And lastly, discutient Plasters are often found very serviceable here, as *Emp. Diachylum simplex, de Meliloto, de Spermate Ceti, vel Diasaponis*.

How they
are to be
brought to
Suppuration.

V. But if the Remedies hitherto proposed prove insufficient to disperse the Tumor, either through some neglect, or any other Cause; the only Means then left is, to bring it to Suppuration. And indeed the Maturation of the peccant Matter is found a very difficult Task in some Cases; insomuch, that the Tumor sometimes remains wonderfully hard and troublesome, even after several Weeks Treatment. Sometimes the stagnating Matter becomes so acrimonious, from its great Inspissation and long Stay, that the Inflammation degenerates into Ulcers, which grow gradually worse and worse, till they end in incurable *Fistule*. In the mean time, to promote and quicken the Suppuration, it is generally found of great Service to apply *Emplastrum ex Melle & Farina confectum*, necnon *Empl. Diachylum cum Gummis*: And where these are insufficient, to make Use of the maturing Cataplasms, which we before recommended in a *Pblegmon*, Book IV. Chap. II. § XVI. and in Inflammations of the Breasts, Book IV. Chap. IV. § VIII. Though we must observe here, that Plasters are much more commodious for Use in Infants, than Cataplasms. Lastly, when the Furuncle is sufficiently matured, which we may learn from its Softness and yellow Head, we must have Recourse directly to the Scalpel, and having made an Opening, we must discharge whatever corrupted Matter is therein contained. After this is to be applied *Emplastr. Diachyl.* and the Ulcer is to be daily cleansed from its Matter, till being freed from all Malignity, it is to be healed with Balsamics.

Furuncles
in Infants
how to be
treated.

VI. When sucking Infants are afflicted with Furuncles, it is proper to give the Mother, or Nurse, some purging Medicine, and to order a strict Regimen and Diet: At the same time the Infant should take some gentle laxative Medicine, with absorbent Powders, *ex Lap. Cancror. conch. Mat. Perlar. Pulv. Anisi, & Antimon. &c.* to allay the Acrimony of its Juices. Lastly, those Pustules and Pimples, which arise in the Skin of the Face of some People, are no less than small

small Furuncles, and therefore ought to be treated like them. The drinking of Whey and the mineral Waters is extremely useful for People who are troubled with these.

C H A P. VIII.

Of the BUBO and PAROTIS.

I. **T**HERE are some Kinds of Tumors which arise with Inflammation, only in certain or particular Parts, to which they are proper, as in the Arms, in the Groins, and under the Ears; and these are called *Parotids*, when under the Ears; in the other Parts, *Bubos*. The Bubo and Parotis, what they are.

II. The Division or Distinction of these Tumors, the *Parotis* and *Bubo*, is generally twofold; into such as are *benign*, or such as are *malignant*. Which Distinction, as it regards the different Method of Cure, we shall explain a little more at large. They are said to be *benign*, (1.) When they arise spontaneously, without any preceding contagious and pestilential Disease, as they frequently do in Infants. (2.) Those are also of this Kind which come after benign Fevers, being a critical Discharge of the Disease. But the *malignant* are such as happen in the Pestilence or Venereal Disease, and are therefore commonly termed *Pestilential* or *Venereal Bubos*. The Kinds of these Tumors.

III. With regard to the *Causes* of benign *Bubos*, we must observe, that they arise from the same internal Causes with all the rest of the Inflammations; that is, from an Inspissation and Obstruction of the Blood: So that they differ from other Inflammations only in the particular Part where they are seated, as in the Groins, under the Arms and Ears, where there are many small Glands and much Fat. Causes of benign Bubos.

IV. Nor is the *Diagnosis* of these Tumors difficult, if we do but consider whether there has preceded any Pestilential or Venereal Cause, to occasion that Tumor and Inflammation in those Parts. But great Care must be taken to distinguish a *Rupture* from a *Bubo* in the Groin; for by an imprudent Incision in such a Case, the Life of the Patient may be endangered. Diagnosis.

V. When these Tumors are benign, their Consequences are usually milder and less dangerous: Because they may be generally either dispersed or suppurated. But a speedy Dispersion or Suppuration of these Tumors is found to be more difficult and of pernicious Consequences in Patients of an ill Habit: Inasmuch, that a Suppuration of them sometimes produces *Fistulae*, which are very difficult to cure. Lastly, the *Parotides* are the most difficult to cure, the Inguinal *Bubos* not so difficult, and the Axillary *Bubos* are the easiest of all, as they generally tend to Suppuration. Prognosis.

VI. In *Bubos*, which are unaccompanied with any other Disease, especially those of Infants, the frequent taking of some cathartic Medicine, with an Addition of *Merc. Dulc.* is found to be of great Service; as it draws off the glutinous and inspissated Blood from the Part affected, and at the same time thins the whole. Other Medicines, which attenuate the Blood, should be also used, such as we before proposed for Furuncles. But if there should be any thing of a Fever, Internal Treatment.
the

the Advice of some prudent Physician ought to be called in, who will take care of the Fever, and treat it with proper Medicines.

External
Resolution or
Dispersion.

VII. When the Inflammation is so gentle as to give Hopes of Dispersion, it may be proper to apply discutient Plasters externally; as *Emp. Diachyl. simplex, de Spermate Ceti, de Galbano, Diasaponis, vel de Ranis cum Mercurio, &c.* since by these Means both *Parotides* and *Bubos* have been frequently dispersed.

Suppuration
how pro-
moted.

VIII. But when the Inflammation proves more violent, the Pains more intense, and the discutient Plasters avail nothing, we must then strive to bring it to Suppuration, by the Application of *Empl. Diachylon cum Gummis*, which is effectual here. If violent Pains also afflict the Patient, the frequent Application of digesting Cataplasms warm to the Part, will generally not only mitigate the Pain, but also greatly promote a Dispersion, or else a Digestion and Maturation. Cataplasms of this Kind may be made of the Crum of Bread and Milk, boiled to a proper Consistence, mixing afterwards a little Butter and Saffron therewith: Or Meal with Honey and fresh Butter, reduced to the Consistence of a Cataplasm over the Fire, may be frequently applied warm, and a little Quantity of *Theriaca* may be added to it with Advantage.

The Treat-
ment after
Suppura-
tions.

IX. Cataplasms like the former, or such as we recommended in a *Pblegmon*, and Inflammation of the Breasts, should be thus frequently applied warm to the Tumor, till the stagnating Matter appears to be suppurated. As soon as we find this, we must directly make an Opening, either with the Scalpel or Caustic. See before, *Chap. III. § 10.* But great Care must be taken in the Opening, not to wound any of the large Veins and Arteries which are near the Abscess, as the Jugulars and Carotides in the Neck, the Axillaries under the Arm, and the Crurals in the Groin: For a fatal Hæmorrhage might by that means be brought on. As soon as the Abscess is opened, the Remainder of the Treatment is to be the same with what we have so frequently advised in other Abscesses. More especially it is of Service here to apply *Empl. Diachyl.* as it readily disperses or softens any remaining Hardness that may adhere to the Mouth of the Ulcer.

C H A P. IX.

Of PESTILENTIAL BUBOS, where also of CARBUNCLES.

The Kinds
of Pestilen-
tial Tumors.

I. **P**ESTILENTIAL Tumors are easily distinguished by Physicians into *Bubos* and *Carbuncles*. And here, by the Name of *Bubo* they comprehend all Tumors, not only such as arise under the Ears, Arms, and in the Groins, but also in the Neck, Breast, Arms, Legs, and other fleshy Parts of the Body, which swell and inflame in pestilential Fevers; whilst Nature endeavours to drive out the pestiferous Matter, which lay concealed in the Body.

Diagnosis.

II. Pestilential *Bubos* are distinguishable from other Tumors, by their happening at a Time, and in Conjunction with the Plague, and from their being accompanied in the Patient with the Symptoms proper to that Distemper. For it must be here observed, agreeable to the Testimonies of the best modern Writers, who have lived in time of the Plague^a, that People who are seized and in-

^a As by God's Providence I never saw the Plague, I cannot write any thing of it on my own Experience; yet I was unwilling to be silent on so considerable a Disorder, and not mention what has been observed and confirmed by the best modern Physicians. I therefore carefully perused such

Chap. IX. Of PESTILENTIAL BUBOS, &c.

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fect by the Distemper, if they do not die quickly, are shortly to expect these Tumors in several Parts of their Bodies. They appear sometimes sooner, at other times later. In some the Tumors appear before they are taken sick by, or ever perceive the pestilential Venom: In others, the Tumors are two, three, and four Days, after the Appearance of the Distemper, before they come out; but they are seldom observed to come out later. These Tumors or *Bubos* are sometimes joined with Carbuncles: But though the *Bubos* frequently arise without the Carbuncles, yet the Carbuncles seldom arise without Tumors.

III. It has been this long time observed, particularly in the later Plagues, *Prognosis.* that such Patients as had Tumors come out, without any very bad Symptoms, had them maturate speedily, and were the soonest free from the Distemper. Hence it is not without Reason affirmed, by some of the more learned and modern Physicians, that *almost the whole Business of curing the Plague* consisted in carefully promoting the Eruption of *Bubos* and Tumors; nor that any one could be preserved but by means of those Tumors: While those who rightly cure these *Bubos*, do also at the same time rightly cure the Pestilence. The Case being thus, resolving, discutient, and repelling Medicines, together with Bleeding and Purging, are so far from proper in the Cure of the Plague, that by throwing the Venom again into the Blood, they destroy the poor Patient. Therefore the chief Business of the Physician or Surgeon here, is, carefully to assist Nature in her Endeavours to throw out the Tumors as soon as possible, and to bring them speedily to Suppuration and Maturity.

IV. That this may be effected the more readily, it seems to be much the best *General Treatment.* Way to order the Patient to keep House upon the first Appearance of the Tumors, or rather to keep in a warm Bed, to be more secure from the Air. For by this Means the Patient rests more securely from the external contagious Air, and by the Use of proper external and internal Medicines, the *Bubos* may be more regularly expelled and brought to Suppuration.

V. Externally it is very serviceable to rub the tumified Part pretty strongly *External Treatment.* with the Hands or Cloths, and what is still preferable, to apply external maturative and emollient Medicines, whereby they will come out the sooner. And we shall also here find great Benefit from the Use of a Cataplasm made *ex Fermento Panis calido, vel solo, vel & cum Sale atque Sinapi contrito.* By means of this, the tense Parts are relaxed and stimulated; whereby the pestilential Matter may be received and cast off from the Blood, and come afterwards to Suppuration. Of the like Virtue are not only the Cataplasms, which we before recommended for suppurating other Tumors, in *Chap. II. § 16.* and *Chap. IV. § 8.* but more particularly those which are made *ex Cepis sub cineribus tostis, atque cum Theriaca & Butyro subactis, vel etiam ex Pane Triticeo sive Semilagineo interiori, cum Lacte atque Croco probe concocto.* But there are some Surgeons who prefer emollient Plasters to Cataplasms: Because the frequent Renewal of the Cataplasms requires the Body to be often uncovered, whereby the Perspiration is impeded and disturbed. The emollient Plasters used instead of the Cataplasms, are the *Empl. Diachylum simplex vel compositum*, or such as follow. The excellent

as had observed the last of this Distemper in *Austria, Bavaria, Silesia, Prussia, Poland, Holsatia, Denmark, and Marseilles*, endeavouring to reduce what they had observed with regard to the Symptoms, &c. to a Sort of *Compendium*, that my Reader might rely on them afterwards.

BARBET, in his Treatise *De Peste*, particularly recommends the following Plaster, which seems very efficacious:

℞. *Empl. Diachyl. c. Gummis, de Mucilaginis ana ℥ss. Seminis Sinapi pulverisati ℥ij. Unguenti Basilici ℥iv. m. f. Empl.*

A Plaster of this is to be applied to the tumified Part, after it has been first well rubbed, and to be renewed every or every other Day. The celebrated Dr. HODGES, in his Description of the great Plague in *London, An. 1665*, greatly recommends the following:

℞. *Empl. Oxycroc. ℥ij. Gum. Galban. colat. Caranæ ana ℥j. Picis Naval. ℥ij. cum Ol. Chamæmel. liquato f. Empl.*

This may be used like the former. Nor is the Use of that Plaster to be despised here, which is made of Honey, Meal, and the Yolks of Eggs. But the Blistering with *Cantbarides* and dry Cupping, used by the Antients to forward Suppuration, are wholly rejected by the most expert of the modern Physicians in the Cure of the Plague^a.

A particular
Observation
of BEIN-
TEM'S.

VI. But what the celebrated German Physician, BEINTEM, observes, is not a little surprising and worthy of our Consideration. He asserts, in the last Book of his *Latin* Treatise on the Plague, that pestilential *Bubos* were frequently dispersed and cured without any Danger, merely by the Application of warm Ashes. Though there is scarce any body besides him, that advises to discuss or cure pestilential *Bubos*, without bringing them to Suppuration, or that ever found such a Method safe and successful: But in the Judgment of BEINTEM, the pestilential Venom was not drove into the Blood again in the Discussion, but was rather attracted and carried off by the Ashes.

Internal
Method of
Cure.

VII. To these external Applications it will be proper to join internal Medicines; by the Help of which, the Venom lurking in the Body may be expelled in a gentle Sweat. But such sudorific Medicines, as are very strong and heating, have been always found dangerous and pernicious by the modern Physicians. Warm and watery Drinks have generally been found more safe and useful in this Case, being particularly adapted to temperate the Blood, and excite a gentle Sweat. Among these Drinks, we may reckon common Tea, with the Addition of a little Saffron; or Infusions of other alexipharmic Herbs, as *Salv. Scordium, Ruta, Millefol. Betonica, &c.* or else the plentiful drinking of some warm Ptisan, made with or without *Rad. Scorzonæ*. taken till it excite a constant but very gentle Sweat. And as the more vehement Sort of Sudorifics are improper, so the drinking of cold Liquors are generally found equally pernicious: For they not only wonderfully suppress the gentle Sweat, but also strike in the *Bubos*, in whose Eruption a happy Cure chiefly consists. The Air of the Patient's Chamber should be temperate, neither too hot nor too cold: His Bed should also be the same, and made as convenient as possible. If the Patient should find himself very weak, but without any great Heat, it will not be improper to give a few Drops of *Elix. Proprietatis vel Mixture simplicis, Tinæur. Bezoart. Essent. Myrrhæ, Ess. Scordii, &c.* about thirty or forty Drops for a Dose two or three Times a Day, in some warm Liquor: Or, it may be

^a Yet SCHREIBER, a very modern Writer on the Plague, declares, that in *Russia* Blisters were applied to pestilential *Bubos* with great Success, laying on afterwards the emollient Cataplasms just now recommended. See his *Obs. on the Plague*, p. 23.

requisite to give some proper bezoartic Powder^a. On the other Hand, in warm Constitutions, where the Heat is too violent, it will be proper to give *Nitrum depuratum cum Lapidibus Cancrorum Conchisque præparatis*: Also temperate Acids, as *Succ. Malor. Citreor. Ribesior. Granator. &c. vel Syr. ejusd. cum Aqua Borag. Bugloss.* or any thing that is temperately cooling, to which the Patient has a Fancy; and if the Heat be still more vehement, it may be necessary to drop in *Spiritus Vitrioli Dulcis aliquot guttulas*.

VIII. The Medicines hitherto proposed are all of them allowed to be the most proper to be often taken, and sufficiently powerful to drive out any pestilential Venom that may lurk in the Blood, agreeable to the Writing and Practice of the most expert Physicians, who have lately wrote in *Poland, Prussia, Denmark, Austria, Hungary, Ratisbon, &c.* The Use of these should therefore be continued 'till the Tumors are either dispersed (which they allow to sometimes happen) or suppurated and brought to Maturation, which is the common and constant Practice. In some Cases the Tumor turns suddenly to Suppuration; and in others it remains for some Weeks without being any thing softer. When this is the Case, it is necessary to continue the Use of the forementioned Remedies, 'till the Tumor either breaks of itself, or is fit to be opened like other Abscesses by Incision with the Scalpel, that the pestilential Matter may be discharged and prevented from returning into the Blood.

How the Abscess is to be opened.

IX. When the Abscess is thus opened, we must proceed directly to the cleansing of it; and after the Cleansing, the Wound is to be healed with some vulnerary Balsam, as we before proposed. To deterge and cleanse, the best that can be used here, is *Ung. Digest. cum Theriac. Bals. Sulph. Terebinth. portunculæ permixtum*. At each Dressing the Matter is to be gently discharged from the Ulcer, and, when cleansed, it is to be treated with the forementioned Ointment; but without Tents, unless its Opening should be very narrow: Then applying some proper Plaster, it may be bound up again as before. The best Plasters for this Purpose are, the *Emp. Diachyl.* or that made *ex Melle & Farina*; the Use of which may be continued 'till it is perfectly healed up.

Treatment after Apertion.

X. With regard to the Time of opening the Abscess by Incision, Physicians are not agreed upon it: For there are many, especially of the modern Authors, who have wrote on the Plague, that forbid the Opening of Pestilential Bubos till they are perfectly ripe and soft. Besides, these Bubos, agreeable to the Observation of many, do generally suppurate and break of themselves; insomuch, that, in the Opinion of these Gentlemen, an Opening made by Incision too soon, may greatly endanger the bringing on ill-conditioned *Fistule*, a Stiffness in the Limb, and even a Gangrene^b. Others, on the contrary, will have it, that an Opening made by Incision in the very Beginning of the Bubo, is not only without Danger, but even directly suited to preserve the Patient, and recovering him the sooner from his dreadful Disease. *Vid. EPHEM. Nat. Curios. Cent. VII. Obs. 69. pag. 170.*

The Incision is not to be made too soon.

^a Here SCHREIBER recommends the following Powder to be given every three Hours, having in the first Place vomited the Patient with *Ipecac.* R. *Antimon. Diaphor. Nitrat. Gr. xv. Merc. dulc. Gr. i. Camphoræ Gr. ij. M. F. P. in Sero Lactis vel Hordei decoct. tepid. sumendus, superbibendo ejusdem, 3. v.*

^b The Author of a French Treatise, entitled, *Observations sur la Saignée de Pied*, observes, that in the Plague of *Marseilles*, too early an Incision of Bubos was generally unsuccessful.

XI. Notwithstanding several of the antient Physicians have contended for a speedy and entire Extirpation of Pestilential *Bubos* by the Knife, in order to discharge the contagious Venom; yet the Moderns do not without Reason dissent from their Opinion. For such a Method of Cure is not only found to be too harsh, but also of very dangerous Consequence in many Parts of the Body. In like Manner, all Emetics, Cathartics, Bleeding, and hot cordial Medicines are, by the unanimous Consent of the Moderns, condemned as things very pernicious in the Pestilence; notwithstanding they were held in so great Esteem by the Antients. Such were the Bezoardic Tinctures, hot Essential Oils, and volatile Antipestilential Spirits, together with the *Theriaca* and *Mitbridate*.

C H A P. X.

Of the PRESERVATIVES particularly necessary to defend and preserve the Physician or Surgeon from PESTILENTIAL CONTAGION.

Preserva-
tives hither-
to uncertain.

I. **H**ITHERTO we have been treating of Pestilential *Bubos*. But before we proceed to Carbuncles and *Anthracas*, it will be proper to say something of the means that may be used by the Surgeon to defend himself from the pestilential Contagion, that he escape free in visiting the infected. But before we take upon us this Task, it will be first proper to inform our Reader that we believe there has not ever been yet found a certain Preservative for this Purpose: So far from it, that many of the Remedies purposely contrived and recommended, are wholly useless and improper; even some of them are very dangerous when lodged in imprudent Hands, and are therefore to be cautiously avoided.

Which of
these Me-
thods are to
be avoided.

II. There are many, who assert frequent Purging to be wonderfully adapted to carry the pestilential Contagion off the Body, and prevent it from getting into the Blood. There are Others, who lay great Stress upon sudorific Medicines, Scarifications, and frequent Bleeding, as of great Service to defend the Body from the pestilential *Virus*. Whereas all of them, unless the Body is habituated to them, are great Destroyers of the Strength; and by that means, rather than defend, they make the Body more obnoxious to, and susceptible of, the contagious Venom. Others again believe nothing more effectual as a Preservative against the Contagion, than the frequent and plentiful drinking of certain hot Spirits or Waters, dignified commonly with the Title of Epidemic or Antipestilential. But we shall be ready to judge the use of these also to be equally foreign, and altogether improper, if we do but consider what violent Heats the plentiful use of such spirituous Liquors will excite in the Blood, beyond what it should naturally suffer, and by that means it may be rendered more liable to fall into a Pestilential Fever: Unless the Person has been accustomed to the use of such Liquors before, or else used them with great Moderation. The same Judgment we must always pass upon the common Spirit of Wine, *Aqua Vita*, and the alexipharmic Electuaries and Oils, with all other heating Medicines, since their Nature and Effects are directly the same. Lastly, there are still others who confide in things hung about the Neck, as Arsenic, Mercury, Sand, Camphire, and

and *Rad. Colchici*; or else the keeping open large Issues, from all which they expect a secure Defence from the Plague. When at the same time there can be found little or no Virtue in either, or all of them, to resist the pestilential *Virus*. It has been observed by antient Writers, that Persons afflicted with Ulcers of any standing, escaped the Infection of the Plague: Which Observation is confirmed by SCHREIBER amongst the Moderns. In that Case those Ulcers should by no means be healed. On which account some Physicians have advised Issues as Preservatives; but to no Purpose.

III. The best and readiest Defence against the Plague seems in general to consist in this, that such as are able should remove out of the pestilential or infected Air into some healthy Part of the Country; or, wherever they are, they should keep from the Company of such as are already infected, and not meddle with their Cloths, Bedding, Meat, Drink, or Vessels; and above all, if possible, not to make themselves over afraid of the Disease: But let them always keep a cheerful and confident Mind, with a proper Diet. But for the Physician and Surgeon, whose Business is to relieve the Sick, and for that Purpose must enter dangerous Places, it is best for them to keep up a courageous Mind, and not be anxiously afraid of Diseases, nor even the Plague. For it is to be hoped that those, who risque themselves with these Precautions to succour pestilential Patients, will be preserved in Safety by a Divine Providence. SCHREIBER recommends, as a safe Preservative, the taking every Evening, *Merc. Dulcis* & *Camphor.* of each 1 Gr.

IV. But besides, there are several human Cautions and Observations necessary to be regarded by the Physician and Surgeon. The chief of these are, that *they should never go fasting to visit a Patient sick of any contagious Disease, and much more of the Plague:* But they should always eat something and drink some strong Liquor before-hand, in order to defend themselves from the pestilential Contagion and infected Air. Some Physicians therefore always eat *Bread and Butter, and drink a Draught of Spanish or Wormwood Wine*, or some other strong Wine, before they offer to set a Foot in the Patient's House. By this Method, the celebrated Dr. HODGES writes, that he preserved himself from Infection in the violent Plague at London, chiefly by drinking *Spanish Wine*. DIEMERBROEK tells us, that by the Benefit of *Rhenish Wine* he escaped the Infection in the Plague at Neuburg. Others prepare themselves in a Morning, by eating a slice of Bread soaked in good Vinegar, either simple, or wherein Rue has been infused. SYLVIVS has contrived an acidulated Medicine purposely for this Use, which the Apothecaries call *Aqua Propylactica Sylvii*; and is to be drank to the Quantity of one or two Spoonfuls in a Morning, either alone or with a slice of Bread, by such Surgeons as are going to visit pestilential Patients. Others again assert it to be confirmed by Experience, that some good Broth or Suppings, especially of Chocolate, are of great Service in keeping off the pestilential Venom. CARDILUC mentions his eating a Citron every Morning, *Lib. de Peste, p. m. 70.*—Upon the whole it is my Opinion, that in hot Constitutions, Acids, and Coolers, are the best Preservatives; in cold, the Reverse, at least moderate Cordials.

V. Being come to the Patient's Apartment, great Care must be always taken *that we neither eat nor drink there, nor even swallow our Spittle.* For there is no small Danger in that Case, of swallowing the volatile pestilential Exhalation

The best
Defence
against the
Plague:

(1.) before
we visit the
Patient.

(2.) while
we are with
the infected
Patient.

or

or Effluvia, by which means our internal *Viscera* and Blood would be infected. For which Reason we cannot approve of the Custom of some who are continually chewing and swallowing Myrrh, Cinnamon, Angelica, Zedoary, or the like, all the Time they are in an infected Place. For as such Things excite a plentiful Discharge of *Saliva* into the Mouth, it is hardly possible but some of the infectious Effluvia will be intangled therein, and so go down into the Stomach and get into the Blood. But the chewing of such Aromatics may be very proper at home, as they are in their own Nature wholsom; the Use of them in the former Case being improper only as to Time and Place. We ought also to be particularly careful *not to stay longer in the infected Place or Apartment of the Patient than our Business really requires*: For there is great Danger that the Strength of our Constitution, however considerable, may be overcome by the too great Quantity and Force of the pestilential *Virus*: Whereas we might have easily resisted and sustained a small Quantity of the same infectious Effluvia.

(3.) when we are returned home from the Patient.

VI. After we are returned home from the Patient, it is much the safest way to wash our Hands and Mouth well with Vinegar mixed with Water: For if there be any thing prevailing against the pestilential Venom, Vinegar seems to be the chief. The Cloths are to be changed for others, and exposed to the free Air, and to be afterwards perfumed. Then Suppings of Coffee, or Tea of *Scordium*, Sage, and the other alexipharmic Herbs should be plentifully used. For these excite a gentle Sweat, and so drive out such contagious Particles as might happen to be mixed with the Blood, keeping it free and temperate.

A proper Diet is to be strictly observed.

VII. As an accurate Regimen of the Diet is always healthful in other Cases, so also in Places where the Pestilence rages it is found to be altogether necessary. Therefore so much Aliment, solid and fluid, is always to be taken at one Time, as is requisite to keep up the Strength of the Body, and may be conveniently and perfectly digested. But Care must be taken not to burthen Nature therewith. For it can scarce be said how vastly Intemperance weakens the Stomach and Body and renders it liable to contagious Distempers; from the Crudities and undigested or corrupt Matter, which is by that means lodged in the Blood. Modern Physicians observe, that there is no Occasion for choosing a particular Diet: Ordinary or common Food may be taken as usual, if it be not against Custom and Temperance. In Broths and Suppings should be always mixed, whenever it can be done conveniently, some Vinegar, or the expressed Juice of Lemons or Citrons, a few Capers, or some other subacid Thing of the like Kind. For the Use of every thing gently acid is usually very safe and beneficial in the Pestilence: So that a moderate Plenty of all Sorts of Pickles are in this Case found very salutary*. There is no need of any great Change in the common and daily Drinks: But this I must observe, that those consult best for their Stomach and the Strength of their Constitution, who drink *Spanish*, *Rhenish*, or any other good Wines at their Meals. If any one be accustomed to *Tobacco*, I would advise him to keep up the Habit: But I would not persuade such as dislike it, or are of a hot Constitution, to take Tobacco against their natural

* The Physicians of *Marseilles* were of Opinion, that an Acid was the Cause of pestilential Disorders; because *DEIDIER* in the Dissection of Subjects who had died of the Plague, had found the Hearts exceeding large, and the Blood in them coagulated. But this to me is no Proof at all.

Appetite as a Preservative from the Pestilence. For I think it has been this long Time observed that Lovers of Tobacco have been equally as often and easily seized by the Plague as others who do not use it. Lastly, where Persons have been before accustomed to the Use of Stomachics, Sudorifics, Vomiting, Purg- ing, Scarification, Bleeding, and the like, at certain Times or Seasons, they must be cautious not to break off too suddenly from such Habits, but rather to continue them at their stated Times^a. But for Coition, as it greatly weakens and even ruins the Constitution at such an unfavourable Time, especially if the Habit of the Body be naturally infirm, that should be equally avoided with the Pestilence itself.

VIII. In the last Place, in order to keep off or correct the pestilential Efflu-
via, it will not be improper frequently to hold a Sponge to the Nose which has
been first wetted with simple Vinegar, or that wherein Rue or Lavender has
been infused. The Chamber should also be fumigated with Juniper Chips, Gun-
powder and Brimstone, or with Vinegar, sprinkled upon a red hot Tile or Iron,
in order to expel and correct the pestilential Air.

External
Helps a-
gainst the
Plague.

CHAP. XI.

Of CARBUNCLES, or ANTHRACES.

I. **A** CARBUNCLE is said to be an Inflammation which arises in Time
of the Plague with a Vesicle or Blister, almost like those produced by
burning, or the Application of Cantharides. But this sort of Inflammation ge-
nerally terminates in a *Sphacelus*, and putrifies the subjacent Parts down to the
Bone, they becoming as black as a Coal, insensible and dead. And this seems
to be the Reason why they are by the *Latins* termed *Carbunculi*, and by the
Greeks Anthraces^b.

A Carbuncle
what.

II. A Carbuncle always breaks out very speedily, even in the space of an
Hour or two, attended with Heat and Pain. Upon opening it, there is dis-
charged a darkish and sometimes limpid or watery *Sanies*: Within, the Flesh is
of a black Colour, a *Sphacelus* having then seized the Parts, which spreads more
and more by Degrees: But the putrid Flesh in those who recover, suppurates
and parts from the sound. The size of these pestilential Blisters is various, more
or less, as is also their number in the same Patient. For there is no Part of the
Body which they do not infest: And they generally appear in company with
Bubos; indeed they are seldom or never to be observed without *Bubos*.

The Nature
of Carbu-
cles.

III. The immediate and usual Cause of Carbuncles is doubtless a violent In-
flammation, excited in the Blood by the pestilential Venom. The Inflammation
is speedily and suddenly followed by a Corruption and Sphacelation of the Parts.
But the Parts and Juices do not suppurate into Matter, as is usual in other Tu-
mors; but whatever is internally corrupted separates and intirely falls off. For
the inflamed Parts suppurate at the Margin or Extremity of the Inflammation;
so that if the Patient does not dye suddenly, the sphacelated Parts which have

Causes.

^a This CELSUS very judiciously recommends, *Lib. I, Cap. 10. de Pestilentia*.

^b As to the Term. Carbuncle, Vide CELSUS, *Lib. V. Cap. 28. de Carbunculo. Lib. VI. Cap. 6. § 10. & Lib. VI. Cap. 18. § 5.*

the Carbuncle are by that means separated from the sound and living Parts, and are by degrees wholly cast off.

Prognosis.

IV. Experience witnesses that the Events of a Carbuncle are very doubtful, and much worse than those of *Bubos*: Especially if the Eruptions turn directly either livid or black. But when the Pustules are red at first, and then gradually turn to a Citron Colour, the Danger is much less. Those Carbuncles which arise in the Face, Neck, Breast, or in the Arm-pits, are observed to be of the worst Kind; for they generally kill the Patient.

Internal Treatment.

V. As for the internal Treatment of Carbuncles, whether by Diet or Medicines, the very same is to be observed in this Case, with what we recommended in *Chap. IX. § 7.* of pestilential *Bubos*. For the chief of the Cure consists in keeping the Patient in a gentle and constant breathing Sweat. But SCHREIBER, in his *Observ. on Pestilential Carbuncles*, considering them as a Species of *Sphacelus*, strongly recommends the *Peruvian Bark*, as given in Fevers.

External Treatment.

VI. The chief Design of the external Treatment is, to quicken, as much as possible, the Separation of the Parts sphacelated with the Carbuncle from the sound. Therefore some of the modern Physicians use only Scarification in this Case, with very good Success: For by cutting away frequently the corrupted Parts quite to the sound, they let out the acrimonious and pestilential Matter with the corrupted Blood^a. Others only open the Eruptions with a Pair of Scissors, and having discharged the Matter, they often wash the Carbuncle with *Sp. Vin. Camph.* or *Sp. Vin.* wherein has been digested a little *Theriaca*. They afterwards apply a maturing Cataplasim, like the following.

- ℞. *Mellis cochlearia* iv. *Fermenti panis cochlearia* iij. *Vitell. Ovor.* N^o ij. *Sapon.* ℥ ss. *Quæ probe commisceantur, calidaque superimponentur. Vel,*
 ℞. *Farinæ Siligin. vel Tritic.* ℥ iij. *Aceti* ℥ ss. *quæ ex Aqua vel Lactē ebutyrato decocta atque in Cataplasma conversa cum Mellis* ℥ j. *Crocique contriti* ℥ j. *miscantur, calidaque sæpissime supradentur.*

Whether the Carbuncle should be cut out.

VII. The Application of the forementioned Cataplasms is to be continued till the Carbuncle separates or casts off from the sound Parts. For it is better to dissolve the Carbuncle gradually from the adjacent sound Parts, than to cut it out all at once. Nor are Instances wanting where the Patient has been killed by an unseasonable and entire Extirpation of the Flesh and Carbuncle: For we learn by Observation, that most sharp Pains and other dangerous Symptoms usually follow such an over-powerful Remedy. But where the greatest Part of the Carbuncle is already separated from the live Flesh, the remainder may be safely divided by the Scalpel.

VIII. But if an ill-conditioned luxuriant Flesh grow internally either of itself, or from the Extirpation being made too soon, it is upon all Accounts necessary to entirely consume it by the Application of *Ung. Ægyptiacum vel fuscum Wurtzii*, or else by the Ointment following:

- ℞. *Mellis cochlearia* ij. *Vitell. Ovor.* N^o ij. *Alum. usti pulv.* *Gentianæ Aristolochiæ ana* ℥ j. *m. f. Unguentum.*

^a SCHREIBER advises scarifying, as very advantageous, *Lib. IX. p. 23.*

IX. If the Inflammation inclines the adjacent Parts to a Gangrene, which is not unusual, it will be proper to use the following Ointment:

How to remove a supervening Gangrene.

R. \odot *Absinth.* \mathfrak{z} ss. *Herb. Scord. Flor. Sambuc. Chamæmel. ana* Mj. *Aq. simpl.* \mathfrak{lb} ij. ss.

When these have been well boiled and strained, mix of the best *Sp. Vin. Campb.* \mathfrak{z} vj. *Theriac.* \mathfrak{z} ij. then let it be applied very often and hot to the Parts, by means of Linen Rags folded together, or Compresses, till the Violence of the Inflammation abates.

X. But when these very bad Symptoms are absent, after a Separation of the Carbuncle from the live Parts, it will be proper to cleanse the Ulcer with *Ung. Fus.* WURTZII, or the digestive Ointment before described in Chap. IX. § V. Of *pestilential Bubos*. And this should be done perfectly, lest any of the pestilential Venom should remain behind, and excite the former Symptoms again. Therefore the Deterfion of the Ulcer ought to be continued till there remains nothing of these pestilential Symptoms; and when that is effected, the Wound may be healed like other Abscesses: More especially, it should be dressed with Lint dipped in *Essent. Myrrhæ & Aloës*, applying over an *Emplast. de Lithargyro*, or the like, till the Ulcer is perfectly cured.

What is to be done after a Separation of the Carbuncle.

XI. There are many of the more celebrated Physicians, who, with CELSUS, allow nothing to be more effectual in extirpating and curing Carbuncles, than the actual Caution, or a red-hot Iron. With this they order the dead Parts to be burnt till the Flesh becomes in every Part sensible of the Pain; by which means the e seems to be no Reliques left of the Carbuncle. This Method was observed by Dr. HODGES to be the readiest Way of Cure for Carbuncles in the great Plague at London. But there are abundance of Circumstances which prohibit the forementioned Method of Cure by the Caution from being used in many Cases; as the Dread of the Patient, the Tendernefs and Consequence of the Parts, &c. that rather persuade such Methods of Treatment as we have before proposed; which are therefore to be made use of here. SCULTETUS says, that a dying Carbuncle will start out afresh (which is of dangerous Consequence) on holding a red-hot Iron at a Distance.

Whether Cauteries are to be applied.

XII. The celebrated SYLVIVS thought *Butyrum Antimonii* an efficacious Remedy to extirpate Carbuncles, if the circumjacent Parts were anointed with it. For, in the Opinion of SYLVIVS, it not only prevents the Disorder from spreading, but it also readily makes an Eschar that divides the sound Parts from those which are corrupted, and at length wholly separates them. But such of the modern Physicians as have wrote professedly on the Plague at Vienna and Ratisbon, do by no means agree with him. For if we may believe these, the *Butyrum Antimonii* is so far from being serviceable in Carbuncles, that it rather excites the worst of Symptoms, and often brings sudden Death. In the mean time, we find BOTTICHERUS assenting to the Opinion of SYLVIVS, in his *Loimographia Hafniensis*: Where he frequently praises and recommends the *Butyrum Antimonii* as an excellent Remedy for this Purpose. And SCHREIBER tell us, that many Surgeons applied the *Lapis Infernalis* to the Lips of the Carbuncle; and that, in consequence thereof, it separated with great Ease, by means of a digestive Ointment, and an emollient Cataplasma. But whichever be the Case, the Method by using *Butyrum Antimonii* is, in my Opinion, more safe and preferable to the Way

Whether it be proper to apply *Butyrum Antimonii*.

of Cure by the Cautey. Lastly, whichever of these Methods of Cure practised, the Business afterwards will be always first to perfectly cleanse the Wound, and then to heal it up.

C H A P. XII.

Of VENEREAL BUBOS.

What a Venereal Bubo is.

I. A VENEREAL *Bubo* is a Tumor with Pain and Inflammation arising in the Groins or Arm-pits, after Contact with an impure Woman. *Bubos* of this Kind are distinguished into two Sorts. (1.) Such as arise without any other Symptoms of the Venereal Disease: Or, (2.) Those which are accompanied with the other usual Attendants of the Disease, as a *Gonorrhœa*, and Venereal Ulcers, usually termed *Shancres*.

Symptoms.

II. *Bubos* of this Kind usually arise, as we before observed, after Contact with an impure Woman, who is afflicted with the Venereal Disease: After which, they arise sometimes sooner, and sometimes later; that is, within a few Days after Infection. The Tumor then arises in the Patient with Hardness, Redness, and Pain, either in one or both the Groins, and sometimes in the Arm-pits. So that if we regard the Colour of Venereal *Bubos*, there is little or no Difference between them and the Benign Sort. See *Chap. VIII.* foregoing. Care must therefore be always taken, that we do not mistake one for the other: For such as take Benign *Bubos* for Venereal ones, generally treat the Patient with an unjust Suspicion, Contempt, and a harsh Method of Cure. On the other hand, when Venereal *Bubos* are mistaken for Benign ones, there is Danger lest the Patient, being treated in the mild Method suited to Benign *Bubos*, should be unhappily brought into a confirmed *Lues*.

Diagnosis.

III. The most certain Signs that these *Bubos* are Venereal, are the Patient's having had to do with unclean Women, and from their being, or having been, accompanied with a *Gonorrhœa*, *Shancres*, or other Symptoms of the Venereal Disease. When any of these are present, they give strong Reason to suppose the *Bubo* to be Venereal: But when they are absent, they take off, or at least greatly diminish, the Probability of the *Bubos* being virulent. As soon as it appears from the Patient's Confession, or other Circumstances, that the *Bubos* are Venereal, we must proceed accordingly with Expedition to a proper Method of Cure. Though this Disorder generally admits a pretty easy Cure at the Beginning, yet, when it has gained Ground, either from Delay, improper Treatment, or an irregular Course of Life, a Cure becomes then extremely difficult, and it frequently turns into the *Lues* itself.

Whether a Dispersion be safe.

IV. With regard to the Cure, there are many Physicians who hold a Dispersion of Venereal *Bubos* equally improper with the Pestilential: Because, by that Method, the venereal Venom returns, contrary to the Design of Nature, into the small Vessels; and, by infecting the Blood, brings on a Pox. They therefore judge it necessary to abstain entirely from Bleeding and Purging, and to forward the Tumor to Suppuration as fast as possible. But with Submission to these Authors, I cannot be of their Opinion. For the Cure by Suppuration is not

only

only slow and tedious, but also attended with many Inconveniencies: Whereas I have frequently experienced, with the greatest Safety, much better Effects from the taking of Cathartic and Mercurial Medicines, together with a Decoction of the Woods, and other such Purifiers of the Blood. For by this means the Virulency may be discharged from the Body much sooner than by Suppuration; and the Tumors may be safely dispersed without Danger of a *Lues*, or other bad Symptoms.

V. Whether the Patient have a *Gonorrhœa* or not, the best Way is to purge him with frequent and large Doses of *Merc. Dulc.* as is usual in carrying off *Gonorrhœas*. For in curing a *Gonorrhœa*, you also cure *Bubos* generally at the same Time, and by the same Means. Nor can *Bubos*, be happily cured till the Body is first quite freed from the venereal Venom. When there is a considerable Inflammation, especially in young plethoric Habits of Body, it seems to be altogether necessary to bleed, and give mercurial Purges afterwards, with a Decoction of the Woods, and Essences which purify the Blood. Externally to the Tumor should be applied some discutient Plaster; as *Emp. de Meliloto, de Ranis cum Mercurio, Diachylum*, or the like. At the same time the Patient should keep strictly to a regular Diet and Course of Life; taken scarce any thing but Ptisans made with Barley, Oats, or the like. In the room of ordinary Drink may be taken a Ptisan, made of Barley, Liquorice, and Anise or Fennel: For a Change may be drank a Decoction of the Woods; and for a greater Variety, a little clear and very small Beer. Wine and all other strong fermented Liquors should be carefully avoided, as they generally encrease the Inflammation. If the Patient be kept up carefully to these Restrictions, Venereal *Bubos*, which are not yet inveterate, may be dispersed very commodiously, and without Danger.

VI. But if Advice should be called in too late or the *Bubo* prove so obstinate as not to give way to Dispersion; or if upon any other account the Surgeon is desirous to effect a Cure in the Way of Suppuration, in order to discharge the *Virus* and prevent a *Lues*, he is to diligently promote and quicken the Maturation as fast as possible. But the most powerful Medicines to promote Suppuration have been mentioned at *Chap. III. § IV.* and *Chap. IV. § VIII.* Though it is besides not improper here to rub the *Bubo* with Linen Rags, or the Fingers greased with Butter or Oil, till they grow red with Pain; adding afterwards a maturing Plaster: For by this means a Suppuration is greatly promoted and accelerated. The Plaster to be afterwards applied may be of *Diachylum cum Gummis, vel Emplastrum de Galbano*, particularly when the Patient can as yet walk pretty well. The Plaster may be taken off, and the *Bubo* rubbed well, three or four times a Day, more or less, agreeable to the several Circumstances. Violent Dancing, Boxing, Fencing, and other such Exercises, are also here very serviceable for promoting the Suppuration. But if the Patient cannot walk any longer from his Pains, which is frequently the Case, it may be proper to apply a maturing Cataplasm instead of a Plaster, such as we have described in the Chapters just now mentioned; which are usually much more effectual than Plasters. The best of these Cataplasms for this Case, are those *ex Cepis sub cinere tostis, vel Farina et Melle, vel ex Fermento, vel denique ex mica Panis Siliginei cum Lacte atque Croco decocta*; which are to be now and then applied warm to the Parts, after they have been first well rubbed.

VII. While the former are carrying on, internal Medicines must be also called in to Assistance. The Patient should take a warm Draught of a Decoction

of the Woods two or three Times in a Day, about eight, ten, or twelve Ounces at a Time, with thirty or forty Drops of *Essent. Lignor. Pimpinellæ albæ, Fumariæ, vel Scordii, vel bis similitimum, & Mercurii Dulcis aliquot granis quotidie.* For as these greatly attenuate the Blood, drive it towards the Skin, and correct the venereal Venom, they also greatly promote either a Dispersion or a Suppuration.

The Manner
in which
Bubos are to
be opened.

VIII. These Methods are to be followed till the *Bubo* comes either to a Dispersion or Maturation. When the Tumor appears to be perfectly suppurated, the Scalpel is to be taken in hand, in order to make an Incision upon the *Bubo*: But then it must be done with Caution, to avoid hurting any of the large Blood-vessels in either the *Inguen* or *Axilla*; from whence might ensue a very dangerous Hæmorrhage. The better to avoid injuring these Vessels, the protuberant Part of the *Bubo* should be pressed outwards by the Fingers. But with regard to the Time in which it is proper to make the Incision, it must be always carefully observed not to let it be too soon nor too late: Because both are dangerous: For when they are opened too soon, it occasions Pains, violent Inflammation, and other bad Symptoms: As when they are delayed too late, it generally occasions (as HILDANUS witnesses) the corrupt Matter to return into the Blood, and by infecting the whole Mass, brings on a confirmed *Lues*. If the Patient dreads the Knife, the *Bubo* may then be opened by a Caustic. Here the Reader should turn to what we have said before on Abscesses, *Chap. III. §. X, seq.* When the Matter is once discharged, it will be proper to cleanse the Ulcer with some digestive Ointment, mixed with some *Tberiaca* and a little *Merc. Præcip. Rub.* Afterwards may be applied a Plaster of *Diachylum cum Gummis*; by which means the Lips of the *Bubo* will be sufficiently softened and cleansed: And then it may be healed with some vulnerary Balsam, applied on scraped Lint.

Whether
and when
the actual
Cautery
should be
used.

IX. Sometimes the ulcerated *Bubo* becomes so stubborn, that it will neither incarn nor cicatrize, by the Help of any Medicines; but always affords a copious Discharge of Matter. When this is the Case, and the forementioned Medicines have been used to no Purpose, *viz. Præcip. Rub. & Alum ust.* prove also to be of no Service, there then remains no other probable Method, in my Opinion, than to cauterize the corrupted Parts to the quick by the actual Cautery. For by that means the Communication of the infected Lymphatics may be cut off. From what we have hitherto proposed, it seems to be sufficiently apparent, that it is always safer and more convenient to bring Venereal *Bubos* to a speedy Dispersion or Resolution, when a Cure may be that way effected, than to bring them slowly to a Suppuration. But when the Blood is found too much infected, and already corrupted by the venereal Venom, so that a confirmed *Lues* begins to shew itself, the Cure by Suppuration may be then both proper and requisite.

CHAP. XIII.

Of CHILBLAINS.

Chilblains,
what they
are.

I. **W**E generally give the Name of *Chilblains* to those Tumors which happen in the Hands and Feet from violent Cold; they being at the same time accompanied with Inflammation, Heat, Redness, pricking Pain and Im-

Immobility in that Limb. Sometimes they are of a livid or leaden Colour, and sometimes they break out with Scabs or else with Chaps or Slits, which afterwards penetrate deeper, and become ulcerous. The Humour which they discharge is sometimes a little foetid, and pretty much resembles Pus or Sanies. The Inflammation also frequently turns to a *Sphacelus*. So that I think we may readily conclude hence, that Chilblains wholly belong and ought to be referred to the Tribe of Inflammations: The more because they excite the same Sense of Heat or Burning with other Inflammations^a, and do, like them, terminate in either Dispersion, Suppuration, Gangrene and *Sphacelus*.

II. Chilblains may be known and discovered by several Means: For (1.) We *Diagnosis.* may observe the common Signs of Inflammation which we have but just now mentioned: (2.) We must enquire whether the Patient afflicted with them has been ever previously affected in those Limbs with vehement Cold or Frosts; to which Travellers and Soldiers, who are engaged in Winter Expeditions and Sieges, are often greatly exposed. Lastly, (3.) It is also a Sign that they are Chilblains, when the Patient feels Pricklings or Shooting in the Part, with Heat and violent Itching; and when the Part affected is found inflexible and almost insensible.

III. While the Chilblains are yet tumified and red, and the Part retains its Sense and Motion without any great Heat and Pain remaining, the Disorder is then of the mildest Kind. On the contrary, when they turn livid, occasion the Limb to become stiff and insensible, or excite pricking Pains therein; there is then Danger of a worse Consequence, lest it should degenerate into a Gangrene, or, at least, a deep Exulceration. When the Skin rises into Pustules or Blisters, like what frequently happens in Burns and violent Scalds, it is a Sign that there is an incipient Gangrene upon the Part. Lastly, when the Member loses its Sensibility, turns livid, soft, and flaccid, there is great Reason to suspect that it is then dead, and sphacelated. *The Degrees of this Disorder.*

IV. We have no room to doubt but that the real Cause of Chilblains is the Cause. Cold. For by violent Cold, the Mouths of the small Blood Vessels are not only greatly contracted, but the Blood is also by the same Means rendered too thick; which are the two great Causes of all Inflammation. Nor is there any Symptom that attends this Disorder, but what may be readily explained as a Consequence of these Causes.

V. Though Naturalists are not yet well agreed among themselves concerning the true Nature of Cold, yet I cannot consent to the Opinion of those who look upon Cold to be only the Effect of a Privation or Absence of Heat. But I rather judge it to consist in^b certain hard, sharp, rigid, and saline Particles, which float in the Air: Which are by the Presence of Heat, rendered very minute, soft, flexible, and volatile; but upon the Approach of Cold, they coalesce and become rigid. Now when these Particles insinuate themselves into the small Pores of the Body, they constrict the small Vessels, and by wounding them, either inspissate or stop the Blood. Hence (in my Judgment) we may perceive the Reason why the Cold splits or cleaves the Skin of the Face, Lips, and *The Nature of Cold.*

^a So TACITUS very elegantly, *Annal. xiii. cap. 15.* Many of the Men, upon the Watch, had their Limbs quite burnt with the Extremity of the Cold.

^b V. HAMBERGERI *Diff. de Frigore.*

other external Parts, and afterwards afflicts them with continual prickings and shootings. For the less Motion and Heat the Blood has in any Part, it is the more apt to be inspissated generally. So that it is no Wonder if the Hands, Feet, Heels, Fingers, Toes, Nose, Ears, &c. are more frequently afflicted with Chilblains than any other Parts of the Body; being sometimes slight, but often very violent. Sometimes the Cold is so great as to quite stop the Course of the Blood throughout the whole Body; which then quickly kills the Patient: And we say commonly, that he was frozen to Death, or perished with Cold.

Prognosis.

VI. Though all Chilblains are in the general somewhat dangerous, yet they are more or less so in Proportion to the Extremity and Violence of the Cold which occasions them: In Consequence whereof, more or less grievous Symptoms arise. When the whole Hand or Foot is seized by the Cold, the Danger is generally greater than when it affects only a Finger or Toe. But nothing can be more fatiguing, than that those who have once been afflicted with Chilblains should afterwards become liable, almost every Year, to Inflammations, Pains, Ulceration, and even Gangrene, upon the Approach of any great Frost. Lastly, when Chilblains are ill-treated, by suddenly exposing the Part from the Cold to a Fire, or any thing hot, or by wrapping it up in hot Things, there is great Danger of the Parts becoming black, soft, and putrid: And at length, losing all its Sensation, it may contract a *Spachelus*.

External Treatment.

VII. Having found this to be the State of the Case, it readily follows, that the Cure of all Chilblains must consist chiefly in restoring the Blood to its former Fluidity and free Circulation as soon as possible. But the inspissated Blood requires to be resolved in this Case by Methods very different from those generally used in other Inflammations. For the warm Medicines, which are very beneficial and even absolutely necessary in other Inflammations, are found to be extremely pernicious for Chilblains. Nor can it ever be safe for those who have suffered extreme Cold to expose themselves presently to Heat or a Fire: For Death has been often the Consequence of suddenly exposing the Body to the Vicissitudes of Heat and Cold. It is therefore much more safe and convenient to expose the Patient first to an Air that is either cool or temperate, and to order him to continually exercise his Limbs as much as he possibly can; and lastly, to advance him gradually to a still greater Warmth or Heat. When the Patient is too weak to exercise himself, it will first be proper to bathe the Parts affected with Snow, or cold Water, which will seem to be hot to the Patient: By which means the sharp saline *Spicula*, which stick in the Pores of the Skin, will be drawn out, and the Blood restored to its natural Circulation. Afterwards, when the Limb is become sensible, we may, by Degrees, apply comforting Medicines; such as *Sp. Vini, meri vel cum Theriaca, Oleum item Petreæ, Balf. Sulph. &c.* When the Parts affected have been well rubbed and bathed with these, the Patient may then be advanced towards the Fire, or be put to Bed; endeavouring afterwards to excite a gentle Sweat.

Internal Treatment.

VIII. To answer this Intention, great Service will be had from a few Glasses of hot Wine, wherein has been boiled some Cinnamon and Sugar. For by drinking, or rather gradually supping of this, the Patient generally revives and grows warm, and the Blood recovers its Circulation. Though it may not be improper to give alternately with this, a small Quantity of a sudorific Mixture: As,

R. Aq.

R. *Aq. Galeg. Rutæ, Scord. ana* ʒij. *Tberiacal. Vit. Matthiol. ana* 3vj. *Prophylact. Sylv.* ʒss. *Mixtur. Simpl. vel Tinct. Bezoard.* ʒij. *Syrup. Cinamom. Caryophyllor. ana* ʒss. *Misc.*

A little Draught of this, about three Spoons full, should be given to the Patient every Quarter of an Hour, and the hot Wine as often, till we find the Appearance of a Sweat. If Wine be not at hand, good Ale boiled with Cinnamon, Cloves, and Sugar, may well enough supply its Place. Such Suppings as these should be continued so as to keep up a Sweat for an Hour, or less, according to the several Circumstances. For it can scarce be imagined how certain and expeditious this Method of Cure is for the most grievous Chilblains, which even threaten a Gangrene. But if the Disorders which proceed from Cold are much slighter, this Method is then not so directly necessary, but may be laid aside, though it is much preferable to any other.

IX. When Chilblains tend to Suppuration, it is proper to treat them like other recent Abscesses: First, to cleanse the Wound with some digestive Ointment, as *Ægyptiacum, &c.* then to dress it with *Ol. Ovor. Cera, &c. vel Bals. Peruvian. Essent. Aloës, Myrrhæ, &c.* and lastly, to apply *Emplast. Saturnin. vel de Lithargyro.* Sometimes we shall find Benefit from *Oleum Myrrhæ per Deliquium*; as also from *Mures adusti*, if we may believe the *Ephemerides Naturæ curiosorum*. Lastly a Mixture of *Aq. Calcis cum Sp. Vin. Campb.* will be frequently found of great Service here; or *Rapæ costæ*, which many Writers recommend; particularly CELSUS, L. V. C. 38. And PLINY, L. XX. C. 3. if a Compress dipped therein be bound upon the Part, either alone, or after the Application of the forementioned Medicines. But if a Gangrene or *Sphacelus* appear, the Parts affected are then to be treated in the Method we shall propose in the following Chapter:

How a Suppuration or Gangrene is to be treated.

X. If a Patient has before been troubled with Chilblains, which are used to return every Year, in the Winter; to prevent the Disorder from returning again, he may arm himself by proper Medicines. The best Preservative for this Purpose, is, to anoint the Parts affected with *Petroleum* or Oil of Turpentine, before and while the Severity of the Winter comes on: But when the Disorder has begun to shew itself again by Tumor, Inflammation, and Pain, the disordered Heel or Finger may be wrapped up in a Swine's Bladder, dipped in the forementioned Oils. But the Cold itself should be always carefully avoided, by defending himself well with proper Cloths or Coverings. The Reader may consult at his Pleasure M. A. SEVERINI *Dissert. de Pernionibus in Lib. de Abscessibus.*

To prevent Chilblains.

C H A P. XIV.

Of a GANGRENE and SPHACELUS.

I. HITHERTO I think we have sufficiently considered the Exit of an Inflammation by the Way of Dispersion or Suppuration. It follows, that we now examine the third and last Method wherein an Inflammation terminates, viz. a Gangrene and *Sphacelus*, to which Disorders the antient Physicians

What a Gangrene and Sphacelus are.

Physicians gave the Name of *Cancrum*^a. By a *Gangrene* we understand that most great and dangerous Degree of Inflammation wherein the Parts affected begin to corrupt and put on a State of Putrefaction. But by a *Sphacelus* we understand not an incipient, but an absolute and perfect Corruption, or Death of the Parts.

The Signs.

II. A *Gangrene* may be discovered generally from the following Signs: Namely, the Inflammation, with its Symptoms, which have all along been very violent, do generally undergo a sudden Change, as if they were going off. The Parts which were before swelled and tense, do now become soft and flaccid; and upon pressing with the Finger upon the Skin and Fat, its Impression remains behind, as in an *Œdema*: At length the *Cuticula* separates from the *Cutis*, often rising up in Blisters like those in Burns, filled with a reddish, yellowish, and sometimes black Humour; and the Sense of the Limb is, in some Degree, diminished. The chief Mark whereby we discover a *Sphacelus* is, when after a previous *Gangrene* the Parts turn livid, and entirely lose their Sensation, in such a Manner, that the Flesh may be pricked and cut without giving any Pain: And if the *Gangrene* penetrates deep, so as to affect the Nerves and Muscles, the Limb also loses its Power of Motion. Afterwards the Colour of the Part turns black by degrees, and the Skin feels cold and flaccid: And at length it adheres so loosely to the Flesh, that it may be easily pulled up and off from it. Sometimes the Skin becomes hard and dry, like the Rind of Bacon. Lastly, it yields a most intolerable cadaverous Stench, and the *Sphacelus* spreads by degrees through the adjacent sound Parts; unless there should happen to be a Separation of the dead Parts from the sound: Though it frequently stops of itself, and by forming a circular Suppuration, the mortified Parts are cast off from the sound. I have seen some Cases, where from vitiated Humours a Bladder has arisen, without any previous Symptoms, sometimes of a larger, sometimes a less Size, chiefly in the Feet, more generally in the Toes: Which Bladder was full of Water or *Serum*, and spread itself gradually, blackening and mortifying the Flesh underneath, as in pestilential Carbuncles. There have been other Instances, where the Toes of a sudden have turned first livid, then black, with an utter Privation of Sense and Motion: Nor could any Incision draw Blood from the Part.

Causes.

III. The *Causes* of a *Gangrene* and *Sphacelus* are either external or internal. Among the *internal Causes* we reckon an *Erysipelas*, and all other Inflammations which arise spontaneously, and can by no means be dispersed nor brought to Suppuration. Inflammations of this Kind usually proceed from the Blood's being too acrimonious or corrupted by the Bile, or in a *Scorbutus*: Or when the Circulation of the Blood is too quick or too slow, by reason of old Age or any other Weakness; or lastly, when the Patient indulges himself in a bad Course of Life, with respect to his Diet, or is subject to violent Passions, (especially Anger, Grief, and Fear,) during the Time of the Inflammation. By *external Causes* we mean Injuries from the Air, cold Water, and the Application of topical Remedies externally to the inflamed Parts, which are either cooling, astringent, fat, oily, or the like; together with all great external Hurts or Accidents

^a Vid. CELSUS, Lib. V. Cap. XXVI. N. 31, 34.

which

which frequently happen to the Body through Falls, Blows, &c. as in Wounds, Fractures, Luxations, &c.

IV. A Gangrene is for the Generality, never without Danger; because it easily changes into a *Sphacelus* or entire Mortification, which never admits of a Cure but by taking off the dead Parts. But a Gangrene which is slight; incipient, and not spread far, but only affects the Skin and Fat, is not very difficult to cure; especially when it happens in a young and stout Patient, in a mild and temperate Season, and does little or no Injury to the Muscles and Nerves^a. But the larger, more violent and confirmed is the Gangrene, and the faster it spreads, the more difficult is it generally to effect a Cure; especially in an old or weak Patient^b, or in an ill Habit of Body from a Dropsy, *Phthisis*, or *Scorbutus*. The Weather also being too hot or very cold, or the Parts affected being near the *Thorax* or *Abdomen* may make the Case more dangerous. Nor can this Case be neglected without the utmost Danger of Life: For the putrid Matter being absorbed by the small Veins, and mixed with their Blood, is conveyed to the Heart and Brain, and corrupts the whole Mass; from whence all the vital Actions are disturbed, the Appetite goes off, and Phrenzy with Death follow. So also in large inveterate Ulcers, in the Extremities and Feet of old People, when they become dry and livid, it is almost a constant Sign that a *Sphacelus* and Death are at hand. Death is also prefaged in great Inflammations attended with Spasms, continual Hiccoughs and Belchings, cold Sweats, Faintings, a *Delirium*, and continual Restlessness or Drowsiness, especially if they happen in a Patient who is then afflicted with a Gangrene or *Sphacelus*. And lastly, if the Gangrene be not directly treated with proper Medicines, it commonly turns suddenly into a *Sphacelus*; and if the sphacelated Parts are not timely removed or amputated, the Disorder spreads through the adjacent Parts, and brings on a speedy Death. But in a *Sphacelus* from an internal Cause, and especially at the Verge of Life, the Amputation of a Limb is generally ineffectual: For either the Patient thro' extreme Weakness dies shortly after; or from a bad Habit of Body the Mortification seizes some other Part, and soon terminates in Death.

V. We must therefore always endeavour to treat the Gangrene so as that it may not terminate in a *Sphacelus*. First of all therefore, in plethoric and strong Habits, we are to bleed largely, and to repeat the Operation at Discretion; but in weak Habits, it should be omitted. The Remainder of the Treatment will consist chiefly in observing the three following Directions:

(1.) *To be careful in the Beginning to remove all violent external Causes of the Inflammation:* As too strict a Bandage in Wounds and Fractures, all foreign Bodies which are stuck in the Parts, as Thorns, Splinters, Needles, &c. improper Medicines externally applied, as Ointments, Oils, and Plasters with cooling and astringing Things, as we before observed: All which should be removed as soon as possible.

VI. (2.) The other Observation respects chiefly the *keeping up of the Patient's Strength*, especially in weak and old People. This may be best effected by ordering a Diet which not only affords good Juices, but is also well accommodated

^a See CELSUS, *De Medic. Lib. VI. Cap. 26. § 34.*

^b New Instances may be seen of Death from a Gangrene in old People in LE DRAN's *Obs.* 100 & 101. I have also been Eye-witness to many of the like Cases.

dated to the Age, Constitution, and other Circumstances of the Patient. If the Patient is weak and in Years, is naturally of a cold Habit, has lost much Blood, or abounds with Acidities, the most suitable Diet will be Soups, and strengthening Broths, such as are made of Chicken or Capons, Beef, or some other good Flesh, boiled with Mace, Ginger, or other Spices: As also Suppings of Ale boiled with the Yolks of Eggs, Cinnamon, and Sugar; Eggs themselves poached soft, so as to be potable; strong Gellies of Calves Feet, Hartshorn, and Ivory Shavings; old and rich Wines, as *Rhenish*, *Hungarian*, *Spanish*, *Canaries*, &c. and lastly, fine Ale may do very well, especially for the Poor. With respect to Medicines, the most proper are the *Corroborantia*; usually termed *Cordial*, as the Spirits, Essences, Powders, and Electaries of that Tribe, especially made up or mixed with *Confect. Alkermes*. At Intervals may be drank hot, Tea of Sage, *Scordium Veronica*, and Herbs of the like Nature, with the Addition of a little Cinnamon, or a few Shavings of *Leign. Sassafræ Santal. Citrin.* &c. For by these means the stagnating Blood will be wonderfully resolved and attenuated, its sound and healthy Parts will be retained in a due Circulation, and its noxious Parts will be discharged and dissipated. It is also not improper in this Case, frequently to apply a Sponge to the Nose or Carpal Arteries, which has been dipped in *Aq. Regin. Hungar.* also to bind it upon the Temples. In like Manner we shall find almost equal Benefit from the Crumb of Rye Bread mixed up with powdered Cloves; if it be first macerated in very strong Vinegar, or *Hungary Water*, then made into a globular Form, wrapped up in a Piece of Linen Cloth, and frequently applied to the Nose. For Patients who are of a more warm, sanguine, or bilious Habit, Soups and Pisans mixed with the acid Juice of Citrons or Lemons will be very proper Strengtheners; also Barley Gruel mixed with *Syr. Mali Citrei vel Mori, vel Rubi Idæi, vel Ribesiorum aut Cerasorum acidor.* to be taken daily as a common Drink. When the Heat is small, the Patient weak, or before accustomed to Wine, it may be allowable to mix a little Wine with the Gruel, especially *Rhenish*, and sometimes a Glass of rich Wine may be taken unmixed at proper Intervals; at the same time not neglecting the other Medicines which are proper to be used in Fevers, such as are mild, temperating, cooling, and cordial. But the *Cortex Peruvianus** is by many celebrated in this Disorder beyond any other internal Medicines; they look upon it as the only Medicine in this Case, and administer it in the same Manner as in Intermitting Fevers. I have myself seen the good Effects of this Medicine: Though indeed it has failed in some Cases, which proceeded from an internal Cause, and where the Patient was advanced in Years. See *Art. Acad. Nat. Curios.* Vol II.

(3) External Remedies.

VII. 3. The third and last Observation concerning the Treatment of a Gangrene is chiefly to discharge the stagnating and corrupted Blood from the Parts affected, as soon as possible, and to prevent the neighbouring Parts from being affected thereby. The principal Means to effect this, are (1.) to make use of proper internal *Corroborantia*, or strengthening Medicines; (2.) to make Scarifications (*pro re nata*) by the Scalpel upon the Parts affected, making the Inci-

* Consult WERLHEFFII *Obs. de Febr.* p. 332. taken from the Observations of RUSHWORTH, AMIAND and DOUGLAS. See also a particular Treatise published by DOUGLAS on Mortifications.

sions very numerous lengthways upon the Parts, and of a sufficient Depth, in order to discharge the stagnating and corrupted Blood, and to make way for the Ingress of the Virtues of the discutient Medicines which are applied externally; by which means they can the better penetrate through the small Wounds to the internal Parts. Lastly, (3.) discutient, stimulating, and balsamic *Fomentations* and *Cataplasms* which resist Putrefaction, are to be carefully applied to the disordered Parts: Of which Kind is the following Fomentation:

℞. *Aquæ Calc. viv.* ℥j. *Sp. Vin. Camph.* ℥ij. *Sal. Ammoniac.* ℥ss. *M.*

This may be applied hot with Compresses, it being what I have very frequently experienced and still continue to use with very good Success in these Cases, and in other Inflammations. A very extraordinary and useful Mixture is also made *ex Aq. Calc. ℥j. cum Mercur. Dulc. ℥j.* to be applied like the other. In the Hospital at *Amsterdam* the following excellent Fomentation was used with Success in Gangrenes, within my Remembrance^a:

℞. *Spirit. Vini* ℥ij. *Pulv. Aloës, Myrrh. ana* ℥ss. *Ung. Ægyptiac.* ℥ij. *M.*

Or, *Sp. Vin. cum Aloë, Myrrha, & Croco leniter coctus; vel Sp. Vin. Camph. cum Theriaca mixtus; vel Sp. Theriacalis aut Matricalis cum sexta quasi parte Elix. Proprietat. roboratus;* or, what GARENGEOT greatly extols, *Vinum calidum, Sp. Vin. simplic. vel Camphora roboratum, vel Sp. Vin. Camph. Sale Ammoniaco acuat.* which he extols as an excellent Remedy to revivify Parts which seem to be dying^b. Or,

℞. *Fol. Scord. Abrotan. Absinth. Rut. recent. ana* M. ij. *Flor. Chamæmel.* Mj. *coq. in f. q. Aq. simpl. colatur.*

℞. *Hujus* ℥ij. *adde Spirit. Vin. Theriacal. ℥iv. Sapon. Venet. ℥ij. Salis Gemmæ* ℥ss. *M. f. Fomentum.*

This Fomentation is to be applied hot several Times in a Day to the Parts affected, by means of Linen or Woollen Cloths: And to give a lasting Warmth, we may apply a hot Tile wrapped up in a thick Cloth, or a hot Bag of Sand.

VIII. For the Poor in this Case, there is a cheap and domestic Remedy, but of great Efficacy, recommended by SIMON PAULUS and others, viz. the *Pickle of Cabbages*. VALESIIUS DE TARANTA has long before taught us, that Horse or Cow-dung boiled in Vinegar or Wine, makes an excellent Fomentation for this Purpose. But a long Time after him, we are told that SYLVIVS and BARBET held the same Remedy as a Secret in this Disease: But the Filthiness of the Medicine makes it unworthy a Physician, it being fitter for the Poor and Vulgar than People of Fashion. But there is a neat, as well as a very efficacious, Fomentation for a Gangrene, to be made of *Scordium*, Wormwood, and Southernwood, either separate or mixed, to be boiled in Sea-water, or, where that is not to be had, Salt-water or Vinegar, to be applied hot like other Fomentations several Times in a Day, giving a lasting Warmth by hot Bricks or Tiles, till the Disorder disperses or diminishes. Thus there will be no Occasion to so frequently unbind the Part, and expose it to the Air, to apply more of the warm

^a A domestic Remedy for the Poor.

^a Vid. KOENERDING in *Libello de Gangræna & Sphacelo, Belgico Sermone edito, Amst. 1698, 8vo.*

^b *Chirurgical Operations*, in the Chapter of a Gangrene.

Fomentation: But it is sufficient, nay even preferable, to soak the Compresses well in the Fomentation, and to keep them hot upon the Parts by the fore-mentioned Contrivance^a.

An obstinate
Gangrene,
how to be
treated.

IX. But the more obstinate and nearer we find a Gangrene is to a *Sphacelus*, the more potent Remedies are we obliged to make use of. Such principally are the very numerous, long, and deep Incisions and Scarifications of the Parts affected down to those which are sound. The Incisions are also made not only longitudinally, but also transversely, where they may be so with Safety, as in the Arm, Leg, and Thigh: By which means the Humours which lodge in the membranous Coverings of the Muscles may be the better discharged, and the Tension of the Membranes taken off, and such as stop the Motion of the Fluids by their Stricture be relaxed. Afterwards the injured Parts are to be well rubbed and soaked with the stimulating, discutient, and balsamic Medicines at § VII; to which may be added the Oil of Cloves, or Spirit of Turpentine, both powerful Remedies in this Case. Then is to be applied a penetrating and discutient Cataplasm, that the Blood in the vitiated Parts may be restored as much as possible to its free Motion. The following may serve for a Cataplasm of this Kind:

℞. *Herb. Scord. Malv. Absinth. Matricar. ana Mij. Mentb. Abrotan. ana Mj. Coquantur in f. q. Oxycrati, vase clauso, ad consistentiam Cataplasmatidis sive Pultis, eique postea admisce Salis Ammoniaci ℥ss. Farin. Lin. ℥ij. Ol. infus. Rut. vel Chamæmel. ℥ss. M. f. Cataplasma.*

Always before the Cataplasm is applied to the Part, it should be mixed with some *Sp. Vin. Camph. aut Theriac.* to increase its Virtue. Or instead of this Cataplasm, we may use the following, recommended by the forecited KOENERDINGIUS^b.

℞. *Mic. Pan. Alb. ℥j. Pulv. Absinth. Scord. Ruta ana Mj. Vini q. s. ad consi. Cataplasmatidis, post levem ebullitionem adde Sp. Vini ℥iv.*

This is to be applied warm. In the mean time, it is a necessary Caution to be observed in the Application of Fomentations and Cataplasms, viz. that they should not be renewed too often, but only two or three Times in a Day: For Experience has taught us, that the Humours may by that means be dispersed and attenuated sooner and with more Ease than by uncovering the affected Parts every Hour, as is customary^c. But we must also carefully observe, that Cataplasms and Fomentations should not only be as warm as possible when they are first applied, but are also to be kept warm all the while upon the Parts, by covering them with hot Cloths, Tiles, or a Bag of Sand: By which means they

^a HARRIS (*in Diff. Chirurg. II.*) advises, that, where an Inflammation is just turning to a Gangrene, the Part affected should be dipped, if possible, in red Wine made hot, and fomented with the same.

^b *In Libello de Gangræna, supra citato.*

^c GARENGEOT will have the Dressing not to be opened above once in the Space of four and twenty Hours, in this Disease, (*in his Operations, Chapter of a Gangrene.*) But because the Parts affected may suffer great Alterations in that Time, and as the Virtue of Medicines will scarce last so long, I think it more adviseable for the Surgeon to inspect the Parts two or three Times in a Day, that he may renew the Medicines, know how it goes forward, and what is to be further done, and that he may prevent any bad Accident.

will penetrate, stimulate, move, and attenuate much better; for if they become cold, they prove not only useless, but very pernicious. All Things well considered, we can hardly affirm, that we have any thing that will cure a Gangrene, or prevent a *Sphacelus*; but if the *Cortex Peruvianus* has the Effects attributed to it in this Disease, we need not be troubled with such a Train of ineffectual Remedies, nor charge our Heads with so many irksome Cautions and Observations thereon^a.

X. But if the Parts are already become quite dead, so as to be entirely without Sense, and soft, so as to retain the Impressions of one's Fingers Ends, and appear to be foetid and corrupted; in that Case, all the Medicines in the World will be insufficient to restore the Parts to Life again. But there remains one, though a miserable Remedy, to preserve the rest of the Body, by amputating the dead Parts that the Disease may not spread through the rest which are sound. But a different Course must be taken in this Amputation, according to the Degree of Corruption, and the particular Nature of the Parts so affected. For if only some Extremity of the Foot, *Tarsus*, *Metatarsus*, Ankle, or Instep, or only the bare Skin and Fat are sphacelated, the whole Member or Foot ought not in that Case to be amputated; but preserving the Limb entire, we are to remove only that Part which we find vitiated, and that, in my Opinion, by means of Suppuration, as we taught in *Chap. XI. § VI. seq. Of Pestilential Carbuncles*, or else to be taken off by caustic Medicines. Those who undertake the Cure of a *Sphacelus* by *Suppuration*, are to take three Things chiefly into Consideration: (1.) To effect the Suppuration as soon as possible; then (2.) to remove the dead Crust or Eschar of the Ulcer, and separate it from what is sound; and (3.) to cleanse the Ulcer, to preserve the sound Part, &c. and heal the Wound.

How a
Sphacelus is
to be treated.

XI. To expedite and quicken the Suppuration, nothing equals the making long and deep Scarifications or Incisions, especially near the sound Parts. For by making innumerable Incisions so deep, till we find that we every way touch the sensible Parts, so as to excite Pain, the noxious Matter lodged under the Eschars, may thereby be more easily discharged, proper Medicines will more readily penetrate the Parts, and the dead Parts will, by that means, be more speedily suppurated and the sooner separate from the sound. But the most efficacious Medicines to promote this Separation of the vitiated Parts from the sound, are Emollients and Balsamics which resist Putrefaction, used in the following Method: *viz.* The incised Parts are to be first well anointed with *Unguent. Digestivum*, and then to be carefully treated with the balsamic Cataplasms and Fomentations. To this Place belongs the following Fomentation, besides those mentioned, § VII, VIII, IX.

A Suppuration, how to be promoted.

℞. *Decocti Hordei vel Scordii* ℞j. *Acet. Rutac.* ℥vj. *Spir. Vin. Theriacal.* ℥iv. *Sal. Marin. aut Vulgar.* ℥j. *vel ij.* *Misc.*

^a I made Trial of the *Cortex* lately upon a corpulent female Patient of near sixty, who was afflicted with a Gangrene from an internal Cause, about the lower Part of the *Tibia*, *Tarsus*, and *Metatarsus*, wherein the common Integuments of the Body were already sphacelated and corrupted. But she always threw up the Remedy by Vomit, soon after every time she took it, as she had likewise done other Medicines for some time before; so that I was obliged to lay it aside. But after many other Things tried in vain, I at length restrained her Vomiting by the *Pymont Waters*, drank cold (for she threw them up when warm) and performed the rest of the Cure by the Medicines hereafter recommended for the Cure of a *Sphacelus*. Whence it appears, that all Gangrenes and *Sphaceli* from internal Causes are not incurable, as some Authors have asserted.

This

This is to be applied hot with Compresses to the incised Parts, and frequently repeated, till the Disorder appears to spread no further. We know the *Sphacelus* ceases to spread, when the Tumor of the vitiated Parts subside, and the Lips of the adjacent sound Parts become tumid all round: And on the second or third Day after, a Suppuration is gradually formed, and the sound Parts separate from the vitiated. But to soften and promote a speedy Separation of the Eschar afterwards, the following Cataplasm will be found very serviceable:

R. Folior. Scordii M. ij. Malvæ Hyosciam. Atib. ana M. j. Flor. Lavendul. M. ss. coquantur cum Aceto vel Oxycrato ad consistentiam Cataplasmatidis, cui tandem admisce Farin. Lin. ℥ij. Ol. Lin. ℥j. Sal. Ammoniac. ℥ij. F. Cataplasma.

This is to be applied warm over the whole, and it is to be retained in that Condition of Heat as long as requisite, by the Means beforementioned at § VII, IX. This will wonderfully promote the Separation of the vitiated Parts from the sound; especially if the Bark be taken inwardly at the same time. We read in the *Acta Edinburg.* that a *Sphacelus* is often stopped, and the Ulcer healed by the Use of the Bark inwardly, and the external Application of the Spirit of Turpentine only. This Spirit has long since been much extolled by HARRIS, and I myself have found it extremely serviceable.

The Separation and Cleansing of the Parts how to be effected.

XII. After these Medicines have been used, and when the whole surrounding Skin is gently tumified, with Redness, a Crust or Eschar is formed by Degrees, and the sound Flesh begins to separate from the rest: This is then a Sign that the Disorder has done spreading, and that an entire Separation of the vitiated Parts will shortly follow. Therefore whenever this Separation shews itself, it should be promoted as much as possible, by the Use of some suppurating Ointment, such as is commonly termed digestive: Which may be applied either alone or mixed with some *Theriaca*; to be retained on between the sound and dead Parts, (which may be sometimes a little divided by the Lancet) after which the preceding Cataplasm should be applied. But in all future Dressings, whatever of the dead Parts is found loose, or separated, should be removed every Day: Or, if any of the vitiated Parts should in some measure adhere to the sound, they may be separated by the Scissors or Scalpel, without any great Pain or Danger. After this, it will be proper to remove the Cataplasm, and apply some digestive Ointment, or *Empl. Diachyl. vel Saturnin.* in the room thereof, till the corrupted Parts are entirely cast off, and the Ulcer appears to be well cleansed. The Separation of the corrupted Parts from the sound, may be wonderfully promoted by keeping the disordered Limb in a constant Warmth, by Cataplasms covered with hot Bricks or Tiles, to retain the Heat and avoid the frequent uncovering of the Parts to apply fresh Cataplasms. When the sound Parts are sufficiently deterged or cleansed, we must then proceed to their Agglutination or Cure: In order to which we shall find great Benefit from *Ung. Digestiv. vel Basilicum, vel Bals. Arcei*, together with the forementioned Plasters.

Cautics, which and how to be applied.

XIII. But there are many Surgeons, who, to avoid the Length of Time which is usually taken up in forming a Suppuration, and for some other Reasons, have Recourse directly to *caustic Medicines* in this State of their Disorder. Their Method of Treatment is this: They anoint the Lips only, or else the whole, of the corrupted Parts every Day with *Butyr. Antimon. or Lap. Caust. liquefact.* till the

the living Parts are furrounded by a Sort of Eschar: And always afterwards they apply the forementioned (§ IX and XI.) Fomentations and Cataplasms; in order to prevent the Disorder from spreading, and to make the corrupted Flesh separate from the sound. To this Place belongs the *Aqua Phagedenica* and the *Lixivium rodens* BOERHAAVE in *Mater. Med.* § 462:

R. Calc. viv. fortiss. ℥iij. Ciner. Clavellator. ℥ix.

These are to be first ground separately, and to be afterwards mixed together, adding a little Water; then let them be put in a Glass, and stand in a moist Cellar to dissolve: As soon as they are become fluid, filtrate them through coarse and spongy Paper, and then let the Liquor be preserved for Use. When there is a call to use it, let a Brush or Feather be dipped into it, and afterwards rubbed over the Part, once or twice in a Day, as you shall see Occasion: Or you may wet fine Linen Rags with this Liquor, and lay them upon the Part, not neglecting the Use of the emollient Cataplasms at N^o. VIII or IX. at the same time. This Method of Dressing should be continued till the Parts shall suppurate or fall off in Crusts or Scales. If this Application has so far answered your Intention, you may proceed to cleanse the Wound with Digestives, and afterwards heal with a vulnerary Balsam, as we just now directed above at N^o. XII. But if any Mischief should remain underneath after you have healed, you must again have Recourse to corrosive Medicines, and, as to the rest, proceed as we have directed above. The best Form of a corrosive Application that I have seen, is described by BELLOSTE, in his *Hospital Surgeon*: He is not short in commending it himself; he says, when you are furnished with this, you may spare yourself the Trouble of searching for a better Remedy. The following is the Description of it:

R. Spirit. Nitri vel Aquæ Fort. P. ij. Argenti Vivi P. j. m. f. lento calore Mercurii solutio.

The mortified Part is to be wetted with this corrosive Liquor, which will occasion a speedy Separation of it from the sound Parts. But I myself have seen, where the vitiated Parts were not separated from the sound by this Corrosive; and, what is worse, even the sound Parts were destroyed by the Application of it.

XIV. Several Physicians and Surgeons, particularly the famous ^a BOERHAAVE, advise cauterising or dividing with the Knife down to the Bottom where it is sound, and this Method they prefer to all others. But as this Kind of Treatment carries great Cruelty with it, and cannot be performed without giving the Patient violent Pain, and is frequently attended with Danger, I cannot help preferring the Use of *Suppurants* or *Mild Corrosives*, as a gentler and safer Method of Cure: And indeed the Surgeons of the present Age, in general, are not so fond of calling for the actual Cautey as their Fathers were, especially where they can find Remedies of equal Efficacy.

Of the actual
Cautery in
this Case.

XV. Lastly, when the *Sphacelus* is so deeply fixed in any Part of the upper or lower Extremity, that it has penetrated through the Muscles, as far as to the Bone, and has resisted all the Force of Medicines, or the proper Time for applying them has been neglected; in this Case, for the Preservation of Life in the

Amputation
when to be
performed.

^a BOERHAAVE's Aph. De cognosc. & curand. Morbis, N^o. 462.

Parts that remain untouched, the injured Part must be separated from the Body, with proper Instruments. We shall fully describe the Method of doing this in each particular Part of the Body, when we come to treat of *Chirurgical Operations*. In the mean time, I cannot give the Surgeon a more seasonable Piece of Advice than this: That whenever he thinks the Amputation of a Part necessary, he cannot more effectually consult his own Reputation and his Patient's Safety, than by calling in a prudent *Physician* or two, that may confirm his Opinion of the Necessity of the Operation; and may give him their Assistance if any bad Accident should happen, such as *Hæmorrhage*, Faintings, Fever, and the like, which are very common Consequences of these great Operations. He should, above all Things, consider the Strength of the Patient; whether he is able to undergo the Operation. And where the *Sphacelus* arises from an internal Cause, and the best Remedies have proved ineffectual, the Amputation should not be hastily undertaken: For, in this Case, it is generally unsuccessful; as GARENGEOT and many others have testified. The Surgeon should also be very careful in keeping up the Strength of the Patient as much as possible, lest he should sink under the Discharge of Matter.

C H A P. XV.

Of BURNS and SCALDS.

A Burn,
what.

I. I BELIEVE no one will be offended at our treating of *Burns* as a Species of Inflammation, since the Appearance, as well as Consequences, of both are exactly the same. Injuries that are received in any Part of the Body, either by Fire itself, or by the Instruments heated with Fire, we call a Burn or Scald. Therefore we do not reckon Fire alone as the Cause of Burns and Scalds, but any other Bodies whether solid and hot, as live Coals, Iron, or other Metal, red-hot or melted: Gunpowder, or boiling Liquors, as Water, Beer, Wine, Oil, &c. are all to be reckoned under this Head.

The Nature
of a Burn or
Scald.

II. When any thing of this Kind is applied to the Body, the Fibres and small Vessels of the Parts that are touched by it, will instantly corrugate and burst, whilst the Blood and other contained Fluids will be extravasated, stagnate, and corrupt. The Burns that we receive from solid Bodies are always attended with more grievous Consequences than those which are occasioned by boiling Liquors (which we call *Scalding*) therefore there are different Degrees of this Injury, as there are of Inflammation.

Four Degrees
of Burns.

III. We may very fairly therefore divide Burns or Scalds into four Degrees. The *first*, and slightest, is that which occasions Heat, Pain, and a small Vescication on the injured Part, in a short Time. The *second* Degree is, when the Part is instantly affected with great Pain and Vescication. The *third* is, when the common Integuments, and subjacent Flesh are so burnt, that they form a Crust. The *fourth* and last is, where every thing is destroyed quite down to the Bone. The third Species is nearly allied to the Gangrene, and the fourth to a *Sphacelus*. This illustrates the near Relation between Burns and Inflammations.

Prognosis.

IV. By considering the Degree of the Burn, and the Use and Consequence of the Part burnt, you may prognosticate in what Manner the Injury will terminate. A Vescication raised in the Hand by the Fire, is less to be dreaded, than

than a slighter Burn upon the Eye; for that very tender and useful Part of the Body, can scarce receive any Injury by Fire, without endangering the Loss of Sight. We should also consider the Extent of the Burn, what length of Time it has been upon the Part, before we can form a true Judgment of the Consequences that will attend it: For the Danger will be greatly increased by the length of Time that the Part has been injured, and in Proportion to the Degree to which the Injury has spread itself. For where the whole Surface of the Body is burnt with Gunpowder, or scalded with any boiling Liquor, though the Injury considered in any particular Part, shall be looked upon as a very slight one, yet by being spread to so great an Extent, it is a Disorder of the last Consequence. In this Case, it is impossible for the Patient to lay down or change his Posture without horrid Pain and Torture, which will prevent his Sleep, increase his Fever, and by Degrees bring on a *Sphacelus* and Death itself. And this is the Case more particularly in Infants, since they have less Strength and Patience than Adults, and want Reason to discover which would be the most convenient Situation for them. The Danger of the Burn will likewise be increased, in Proportion to the Depth to which it has penetrated. Burns of the Face are not only to be dreaded for the Deformity which they occasion, but chiefly for the Inconveniences that they may produce by causing the Eyelids to grow together. Deep Burns of the Neck, if not timely remedied, occasion a Wryness of that Part. You will easily be able to foretel what Danger or Inconvenience will arise from Burns of any other Part, if you diligently consider what we have here said, and are well skilled in the natural Use of the injured Parts.

V. As we observed above that Burns nearly resembled inflammatory Disorders in their Degrees, so do they in the Method of Cure. In the slightest or first Degree of a Burn, the Intension is to disperse it by the Remedies which we advised for a *Pblegmon*, (Chap. II. § IX.) Of these there are two Sorts, *Astringents* and *Emollients*. The best slight Astringent is, *Spiritus Vini^a vel Vulgaris bonæ notæ, vel rectificatus, vel & camphoratus*. This may be applied to the Part with Linen Rags. With the same Intension also you may order *Acetum Lithargyrisatum, Muria Brassicæ conditæ, vel & Oxycratum cum Sale decoctum calidumque*: These may be applied in the same Manner with the foregoing, and should be repeated as you shall see Occasion. *Oleum Terebinthinæ* has very good Effects in this Case, if you apply it in Time, and repeat it frequently. The vulgar Method of applying the burnt Part to a Candle or the Fire, and keeping it in that Position as long as you can bear it, repeating this Process till all Sense of Heat and Pain is entirely removed, is frequently attempted with Success, where the Injury is in one of the Fingers or on the Hand. For the stagnating Fluids are by the Force of the Fire driven back into their proper Channels, and by this Means the Vescication and other troublesome Symptoms which usually succeed, are happily prevented. From hence it appears, that the first Degree of Burns is easily remedied.

Cure of the first Degree by dispersing Remedies.

VI. There is another Method of Cure, which is equally efficacious with the former, though it is founded upon a contrary Intension. This is by *emollient Remedies*, which remove the Tension of the Fibres and Vessels, and restore the

By Emollients.

^a This is highly and deservedly recommended by the great SYDENHAM, in his *Practical Works*.

Blood to its natural Course, before any bad Symptoms come on. The injured Part may be fomented with Water, as hot as the Patient can bear it, till the Pain and Heat entirely disappear. SYDENHAM highly recommends this Practice, and, in my Opinion, with great Justice. But this Fomentation will be improved if you boil some emollient Ingredients in the Water, as *Althæa*, *Malvæ*, *Verboscum*, *Sem. Lini*, *Fœnum Græc.* *Mali Cydonii Semina*, or others of this Intention. But emollient Cataplasms are of the highest Service in this Case, made of any of the abovementioned Ingredients for a Decoction, and frequently laid on upon the affected Part as warm as they can be endured. Emollient Oils also have their Use in forwarding this Intention, as *Oleum Lini*, *Amygdalarum dulcium*, *Olivarum*, *Liliorum alborum*, *Hyosciani*, and the like. These Oils are to be used either by dipping Rags into them, and applying them to the burnt Parts; or they may be laid on frequently with Feathers as fast as they begin to dry away. We must not omit in this Place to mention a famous Liniment of MYNSICHTUS, which he calls his *Unguentum ad Ambustiones*. This is composed *ex Oleo Lini vel Olivarum cum Albumine Ovi mixto*, and applied as the Oils above. *Mali Cydonii Mucilago* is properly enough prescribed in this Case. The Remedies which we have here recommended never give effectual Relief, unless frequently repeated. Therefore when the Face is burnt, they should be spread upon a Linen Mask, which you must keep continually moist by fresh Applications of the Remedy. (See Plate XXXVII.) Where the Neck is burnt, to prevent it from contracting you must have Recourse to a particular Kind of Bandage, which you will find described below, when I come to treat of Bandages.

Cure of the
second De-
gree.

VII. When the Burn is of the second Degree, which I have described above, attended with Vescication or Postules, I would by no means advise opening the Vescications or scarifying the lacerated *Cutis*, because this Practice brings on very sharp Pains. You will always find it more adviseable to apply one of the Remedies prescribed above; the nearest at hand, suppose warm Water, burnt Wine, or Spirits of Wine; and renew the Application of it frequently. By this Means you will find the Heat and Pain quickly go off, and the Cuticle will separate from the *Cutis*, without leaving any Deformity. But if, notwithstanding the repeated Applications of these Remedies, some Pain shall still remain, dress the Part with Emollients. The most eligible of these are *Oleum Lini*, *Unguentum ad Ambustionem MYNSICHTI*, *vel Nutritum, de Lithargyrio, vel Diapompholygos*: These should be either rubbed into the Part frequently, or spread upon a Linen Rag and applied to it. After the Heat and Pain are removed by these Applications, lay on the *Empl. ad Ambusta, vel de Minio*, which will keep the Skin smooth, and forward the Renovation of the Cuticle. If the Injury is very considerable as to its Extent, and great Part of the Body is scalded or burnt, it will be necessary to open a Vein and bleed plentifully, even *ad animi deliquium*, and afterwards you should prescribe a brisk Purge, of the same Kind which we directed for Contusion. (Book I. Chap. XV. § XIII.) This Method may possibly prevent ill Consequences which usually attend Burns of large Extent, such as foul Ulcers, large Cicatrixes, and Gangrene itself. The same external Dressings are to be applied in this Case which we advised above. When *Infants* are the Subjects of this Disorder, their tender Age prevents us from Bleeding plentifully: Therefore the Revulsion must be made by repeated Purging. That strict Regularity in Diet which we enjoined above in treating of Wounds,

Wounds and Inflammations, is never more requisite to be observed than in this Case: All Intemperance is of the last Consequence, as it increases the Fever and Pain. According to the Opinion of the famous DRUGBY, nothing takes off the Heat sooner than *Spiritus Salis* given from *Guttae* x to xv. in any Liquor, and repeated at Discretion. These Methods being timely and diligently prosecuted, heal and restore the burnt Parts of the Body in a most wonderful Manner.

VIII. In the third Degree of Burns, where the injured Part is covered with a Crust or Eschar, the Cure cannot be performed without Suppuration. When this happens in the Face, we should use all our Attention to prevent Deformity, which may be occasioned by a large Cicatrix. Therefore in this Case, the Use of all Plasters and Ointments whatsoever is to be avoided, even though they should be esteemed as valuable Secrets, and highly commended for their Virtue in curing Burns and Scalds. For the Mischief of these Kinds of Remedies is, that they dry up the Wound too fast, and at the same time contract the Fibres and the Skin, and by that Means leave a very unequal Cicatrix. For the same Reason you cannot be too solicitous in forwarding the casting off of the Eschar, and the Evacuation of the Matter that is concealed under. But to discover the happiest Means of performing these Intensions, *hoc opus, hic labor est*. They who attempt this by tearing away the Eschar with their Hands, or endeavour to separate it with the Knife, by no means consult the good of their Patients. The easiest and most successful Method, in my Opinion, is, by the Use of Emollients. Any of the Emollients we mentioned above may be applied warm, and repeated till the hard Crust separates from the live Flesh. The Part should be dressed two or three Times in a Day, and at each Dressing, if you should observe any Portion of the Crust tending to a Separation from the rest, you should remove it with your *Forceps*, and anoint the remaining Crust with Butter, at the same time being never neglectful of the Use of Fomentations. This Method sometimes takes up two, sometimes three, sometimes four Days before it performs its Office. The Crust being now entirely cast off, our next Intension is, to cleanse and heal the Wound. The first of these Offices may be very well executed by any mild digestive Ointment, mixed up with *Mel Rosarum*: The Medicines used for healing the Wound, are principally *Unguentum Diapompholygos, vel de Lithargyrio, necnon Emplastrum ad Ambusta*. But if any Portion of the Eschar is left under these Ointments and Plasters, Experience sufficiently testifies the Danger that will follow, of making a deformed Cicatrix, from the Construction of the neighbouring Parts, and from the Acrimony of the confined *Sanies*. Whoever prosecutes this Method of Cure, should always observe, that if the Eschar does not separate in two or three Days, it will be necessary for him to make a deep Incision into it, that the *Sanies* may have room to discharge itself, (as we advise in the Case of Gangrenes, *Chap. XIV. § VII.*) And then the Fomentations above mentioned are to be diligently applied, the Evacuations by Bleeding and Purging being always premised. Proper Regulations with regard to Diet are never more necessary to be complied with, than in this Case. The best Method of encouraging the Renovation of the Skin, is, by frequently holden the burnt Part over the Steam that arises from boiling Water. Where the Part skins over very slowly, it may be proper to dress the Part with a Cerate made *ex Cera & Olorum Oleo*.

Cure of the
fourth De-
gree.

IX. But what is to be done in the fourth Degree, which we have described, which is always attended with extreme Danger? For when the Burn has penetrated so deep as to destroy all the Parts, quite down to the Bone, Medicine can take no Place. Therefore there remains but one Remedy, and that a dreadful one, to wit, to amputate the injured Limb, that the sound Parts may be saved, as we advised above in treating of a *Sphacelus* (Chap. XIV. § XIV.)

CHAP. XVI.

Of a SCHIRRUS.

A Schirrus
what.

I. WE have already taught, that the fourth Manner in which an Inflammation terminates is a *Schirrus*. We usually call a hard Tumor of any Part of the Body, that is void of Pain, a *Schirrus*: This almost always arises from the Inspissation and Induration of the Fluids contained in a Gland; though it may appear in other Parts, particularly in the Fat^a.

Seat of a
Schirrus.

II. The Seat of a *Schirrus* is very various: For this Disorder is not confined to the internal Parts alone, to wit, to the Liver, Spleen, Lungs, Mesentery, Pancreas, and in Females to the *Uterus*: But it frequently happens also to the external Parts, as to the Lips, Tongue, Tonsils, *Fauces*, Palate, Gums, Neck, *Mammæ*, *Axillæ*, *Inguina*, *Penis*, and Testicles; and that generally after a previous Inflammation of any of those Parts. A *Schirrus* sometimes appears without any previous Inflammation; especially in Subjects of a heavy, phlegmatic, melancholic Habit of Body. Sometimes it is occasioned by an external Injury, as by a Fall or Blow, &c. It is no difficult Matter to determine the principal Cause of the Disorder.

Effects of a
Schirrus.

III. As soon as a *Schirrus* is formed, it is an immediate Consequence that not only the indurated Part becomes unfit to perform the Function allotted it by Nature, the neighbouring Parts also will suffer Pressure, and be impeded in the Performance of their Offices. Therefore it ought to appear no Wonder that the neighbouring Parts should be subject to Inflammations, Exulcerations, Cancer, Gangrene, *Tabes*, Stiffness, Immobility, or the like, according to the Nature of the injured Part.

Signs.

IV. You will be at no great Difficulty in determining the Case to be a *Schirrus*, when you discover a hard Tumor, on the external Parts (more particularly in those Parts where the Glands are most frequent) and the Tumor is entirely free from Heat, Redness, and Pain. As I am speaking to *Surgeons*, I only treat of external *Schirri*: For those which are situated in the internal Parts, fall very justly under the Province of the *Physician*.

Prognostic.

V. In order to form a proper Prognostic of this Disorder, several Things are to be observed: (1.) The more inveterate the *Schirrus* is, so much the more dangerous will it be, and more difficult of Cure. (2.) A *Schirrus* happening to young Persons, and to those of a firm Habit of Body, is much more safe and tractable, than when it falls upon Persons advanced in Years: Particularly

^a See a learned Dissert. of GRASHUSIUS, an eminent Physician at Amsterdam, on the *Schirrus* and Cancer.—Amst. 1741.

where

where Children have indurated Glands in the Neck, but are in all other Respects in perfect Health, they are seldom attended with any Mischief, and you usually find they outgrow it: But in Vafetudinarians, or where you have Reason to suspect the Pox to be at the Bottom, the Case is far otherwise. (3.) A *Schirrbus* is of more or less Consequence in Proportion to the Consequence of the Part it falls upon, in Performing the necessary or noble Offices of Life. For this Reason, internal *Schirrbi* are always more dangerous than those which happen upon the external Parts^a. Lastly, (4.) The greater Mischiefs the *Schirrbus* brings on, by so much the more grievous will it be. For as long as it lays quiet, and produces no Pain, so long will it remain without Danger: But as soon as it becomes painful, or is ulcerated, it generally threatens an approaching *Cancer*. It may be proper to inform you in general, that the Cure of *Schirrbi* by Medicine, is usually attended with the greatest Difficulty: Therefore you should never flatter your Patients with the Promise of certain Relief. But sometimes they do admit of a Cure with the Knife or with Corrosives, especially in younger Subjects that are otherwise of a good Habit of Body.

VI. When the *Schirrbus* is of long standing, and the Patient infirm, it is far better to abstain entirely from any Attempt to cure it, than to pretend to bring it to Digestion. For in this Case, it is much to be feared, especially in the Breasts of Women, that whilst you are prosecuting your Intention, the diseased Part may shew its bad Disposition, and become apparently cancerous. On the other hand, where the *Schirrbus* is but newly formed, and you have no Signs of vehement Pain or Hardness, where your Patient is otherwise of a sound Habit of Body, I see no Reason why you should not use both external and internal Remedies, to set the confined Fluids at Liberty. The internal Remedies, which are found principally serviceable in answering this Intention, are the Decoctions of the Woods, digestive Tinctures or Essences, and mild Mercurials, giving between whiles relaxing Medicines, to resolve the thick inspissated Humours. It is very dangerous to trust to the Use of external Remedies alone: Therefore a prudent Physician should always be consulted in this Case, who may not only prescribe proper internal Remedies, but direct the Patient also what Sort of Regimen will be most useful for him to observe, with regard to his Diet.

VII. With regard to external Resolvents, *Plasters* claim the first Place: Such I mean as are made of the warm Gums, as *Gum. Ammoniac. Galban. Opopon. Sagapen. Bdell. &c.* which may be applied alone or mixed together; sometimes with the Addition of *Radix Bryoniae atque Aristolochiae rotundae* finely powdered. Of the same Intention are *Empl. de Galbano, de Gum. Ammoniaco, de Cicutâ, de Ranis VIGONII, vel Diachylon cum Mercurio*; or the following:

B. Gummi Galban. Opoponac. ana ʒj. Ammoniac. Bdell. quæ ʒij. Ol. Olivæ. ʒij. Cera Citrin. ʒss. Pulv. Aristoloch. long. ver. & rotund. ver. Lapid. Calaminar. Myrrh. Thur. ana ʒj. Terebinthin. Venet. ʒiv. m. f. s. a. Emplastrum.

^a Where a *Schirrbus* falls on the internal Parts, particularly the Mesentery or the Lungs, it is generally attended with such Tumors, as destroy the Patient.

For the internal Method of Cure, see my *practical Compendium*, Cap. xii. Sect. 29 & 30.

(2.) By
Cataplasms.

VIII. The next Place to Plasters is held by *Cataplasms*. Amongst the principal of which may be reckoned the following:

R. *Rad. Bryon. alb.* ℥iv. *Aristoloch. rotund. Angelic. ana* ℥j. *Herb. Sabini. Rut. Scord. Absinth. Flor. Chamæmel. ana* M. j. *Melilot. Sambuc. Althæa. Centaur. minor ana* M. ss. coq. cum q. s. *Aque simplic. ad consistentiam Cataplasmat. vase clauso, sub finem addendo Galban. (Vitell. Ov. q. s. solut.)* ℥iij. *Farin. Lini* ℥ij. *Ol. Lini* q. s. f. *Cataplasma.*

This Cataplasma, or, if you rather choose it, a Fomentation made of the same Herbs boiled in Vinegar, is to be applied warm, and repeated as you shall see Occasion, not neglecting at the same time the Use of internal Remedies.

(3.) By acid
Vapours.

IX. Some highly recommend acid Vapours in this Case. Sometimes it has been found serviceable to receive the Steam of boiling Vinegar upon the diseased Part, either of common Vinegar, or of that made with Lavender, Alder, Rue, or *Theriaca*. Some sprinkle the Vinegar upon a hot Stone, and receive the Steam through a Funnel. Others set Sulphur on Fire, and hold the Part over the Fume. Others again are fond of Fumigations of *Cinnabar*. Great Care must be taken in this Case not to raise too large a Fume, nor to repeat it too frequently, and the Patient must be cautioned not to admit it at the Nose or Mouth. For it can scarce be said how injurious these Steams are to the Lungs, and the Quantity of Mercury contained in *Cinnabar*, makes it very apt to raise a Salivation.

(4.) By
Mercurials.

X. Mercurial Medicines perform Wonders in this Case, either administered in the Beginning, or after other Remedies have failed. Besides giving Mercurials internally, you may make an excellent Ointment, *ex Hydrargyro cum Adipe Suillâ, necnon modico Terebinthina, quantum ad eum subigendum sufficit, admixtis in Mortario vitreo vel lapideo.* The Schirrhus should be anointed twice or thrice a Day with this, covering it with the *Emplastrum Vigonis cum Mercurio*. But to prevent this Method from raising a Salivation, it will be necessary to prescribe an opening Medicine every fourth or fifth Day, such as *Rad. Jalap. præp. or Extraß.* &c. in small Doses. Whilst the Patient is in this Course, his Jaws should be very diligently inspected, and if you find the Glands enlarge and grow painful, you must entirely omit the Use of Mercurials, and repeat your purging Medicines, till all these Symptoms of an approaching Ptyalism entirely disappear. By observing these Cautions, you may have very good Reason to promise yourself Success, where you are called in Time, before the Case is become desperate.

(1.) By the
Knife.

XI. If all the abovementioned Remedies prove unsuccessful; if the Schirrhus is free and moveable, and its Situation threatens no great Danger from the Neighbourhood of considerable Vessels; if you shall judge the Strength of the Patient to be sufficient to undergo the Operation, you may very fairly call the Knife in Aid, to prevent the Case becoming cancerous (which too often happens.) When you have taken out the Schirrhus, dress the Wound with a digestive Ointment, and afterwards with the *Linimentum Arcaei*, or any other vulnerary Medicine, and heal as we have directed in other Wounds. This Method DEIDIER particularly recommends, *Lib. de Tumor. p. 129.*

When the
Case is en-
tirely to be
let alone.

XII. Where the Schirrhus is fixed, knotty, uneven, and deeply rooted; where the Patient is of a bad Habit of Body, is subject to form Schirrhi from some hereditary

hereditary Taint, or perhaps has formed several already; or lastly, where the Situation of the Disorder is such, that, from the Vicinity of considerable Veins and Arteries, you are in apparent Danger of bringing on an Hæmorrhage which may prove fatal: Then all Attempts to cure, whether by the Knife, or by digestive or corrosive Applications, are to be neglected*. For this Kind of *Schirrhus* is almost constantly attended with very sharp Pains, and often degenerates into a *Cancer*. In this Case therefore the Pains are to be assuaged, if possible, and the *Cancer* to be prevented.

XIII. When you are under Apprehensions of an approaching *Cancer*, your Internal Business is not only to attempt to correct the Acrimony of the Blood, by the Use of both internal, as well as external Remedies, but a strict Regimen with regard to Diet, must also be most religiously enjoined. Constitutions of this Sort are much mended by the Use of Broths and Soups of various Kinds, made from the Flesh of younger Animals, with the Addition sometimes of a few Pot-herbs, *sc. Hordeum, Avena, Oryza, Milium, Spinachia, Asparagus, Scorzonera, &c.* The most wholesome common Drink in this Case, is either fair Water, or a Pisan made *ex Decocto Radicis Chinæ, Sarsaparill. Gramin. Polygod. Veronicæ, Lingue Cervinæ, Agrimon. Solidagine, Sarsenica, Herb. Parietar. Capillar. Veneris*, and others of this Kind. When the *Schirrhus* is attended with violent Pains, you may add to the Materials of your Decoction, *Sem. Papaver. albi*, and if the Patient has no Objection to it, you may sweeten it *cum Sirupo Papaver. albi*. It will be very proper also at this Time to correct the Acrimony of the Blood by giving two or three Times every Day, a Dose, *e Pulv. Lap. Cancr. Sale Absinthii, Cinnabari Nativæ, Antimonio, Crudo, Antimonio Diaphoretico*, adding to each Dose, as you shall see Occasion, *Laudani Opiati gr. ss.* to assuage the Vehemence of the Pain. Wonders are also effected in this Case by the *Pulvis Succusve recens ex Millepedibus*, with *Sperma Ceti ad ʒj.* to be given with any of the foregoing Powders; by Purges even of the Mercurial Kind, and by bleeding and cupping frequently in Spring and Autumn.

XIV. A thin Plate of Lead, well impregnated with Quicksilver, may very conveniently be fastened on the Part, and worn there constantly with some Benefit. For this Method frequently lessens the Sense of Heat and Pain, not to say that it frequently prevents the *Cancer*. But if the Application of a Plate of Lead shall seem to be unequal to the Intention for which it was designed, then you may apply Plasters and Ointments composed of such Ingredients as are most likely to assuage the Pains. Of this Kind are the following:

- ℞. Unguenti Diapompholygos ʒij. Opii puri ʒss. m. f. Ung. quocum pars affecta sæpius inungatur. Vel,
- ℞. Amalgam. Mercur. & Plumbi ʒj. Unguenti Rosati q. s. m. f. Unguentum cum Linteo instar Emplastri applicandum. Vel,
- ℞. Aceti Lithargyrisat. ʒj. Olei express. Sem. Hyoscyam. Papav. alb. Olei infus. Rosar. ana ʒij. m. f. s. a. Nutritum, cui sub finem add. Opii puri gr. vj. ad x. quod lintæolis illitum aliquoties quotidie super Schirrhum applicetur.

* But if the Surgeon is expeditious in stopping the Blood and dressing the Wound, he may sometimes attempt the Cure of the most inveterate Schirrhi, and not without Success. I have myself often undertaken very extraordinary Schirrhi in the parotid and submaxillary Glands, where I was obliged to cut the large Ramifications of the external Carotid Artery: Nor did any one of those Patients miscarry.

If your Patient dislikes the Application of these Ointments, and prefers a neater Application, you may substitute refrigerant Plasters in their room: Such as *Emplastrum Saturninum* MYNSICTH. *de Mino*, *Diapampholygos*; or lastly, that excellent Plaster for alleviating Pain, which is prescribed in the following Manner:

R. *Succ. recent. express. & purificat. Fol. Hyoscyam. Papav. Hortens. Pbellandi ana* ℥iv. *coquendo leni igne inspissa; sub finem add. Ceræ alb. ℥viij. Ol. infus. Rosar. ℥j. m. f. Emplastrum. Vel.*
 R. *Sacch. Saturn. Ceruss. præparat. Amalgam Mercurii & Saturni, Ol. express. Hyosciam. infus. Rosar. ana* ℥ij. *m. f. Emplastrum.*

If the Pains are very violent, you may add a discretional Quantity of *Opium* to either of these Plasters, and apply it to the Part.

XV. Notwithstanding many Physicians and Surgeons of Eminence at this Time recommend the Use of *Suppurants*, *Corrosives*, and even the *actual Caustery* for the Cure of schirrhous Tumors, yet I cannot help being of Opinion, that the Danger of a Cancer ensuing from the Use of *Suppurants* or *Corrosives*^a, and the natural Dread that most People are struck with at the Sight of a red hot Iron, besides innumerable other Inconveniencies, ought to dissuade us from attempting such slow, hazardous, and cruel Methods of Cure. For this Reason it will appear, that the safest and readiest Method of destroying a large or painful *Schirrhus*, is, to cut the indurated Part entirely out, whether it be situated on the Lips, Salivary Glands, *Mammæ*, or Testicles, provided you run no Risque of a mortal Hæmorrhage, (§ XI, XII.) If you leave any Part of it behind, there is great Danger that it may lay a Foundation for a Cancer: Nay, what is hardest of all, though the *Schirrhus* be entirely rooted out, it frequently happens that another springs up without any Fault to be laid to the Surgeon. I can by no means approve of the Practice of some Physicians, who order the Bottom of the Wound to be cauterized, to prevent any Return of the *Schirrhus*, and to take off the Hæmorrh. In this they are doing nothing^b, since it is of very little Consequence in preventing the Return of the Disorder, and there are many milder and safer Remedies at hand to stop the Hæmorrhage. Therefore when you have finished your Operation, dress as in other Wounds.

What is to be concluded concerning Suppurants, Corrosives, and the actual Caustery.

CHAP. XVII.

Of a CANCER.

A Cancer, what.

L WHEN a *Schirrhus* can neither be dispersed, softened, (See Chap. XVI. N. XII and XIV.) or taken out with the Knife, whether it be occasioned by the Vehemence of the Disease, or the Ignorance and Maltreatment of the Surgeon, the Patient will complain of pricking Pains in the Part, and the Tumor will spread itself unequally. This malignant and worst State of a *Schirrhus*

^a There are some Instances, where Schirrh and Cancers have been cured by Caustics; but in general they are unsuccessful.

^b This was observed in the most antient Times. See CELSUS Book V. Chap. XXVII. § 2.

was called formerly *Carcinoma*, by us a *Cancer*. For the Veins about the Part are distended, and form Incurvations, which some imagine bear a Resemblance to a Crab's Claws. As long as the Tumor is entirely covered with Skin, it is called an *occult Cancer*: But when the Skin breaks and is ulcerated, it is termed by the Physicians an *ulcerated Cancer*.

II. The Beginning and Increase of the Disease afford pretty near the following Appearances. At first there appears a very small Tumor, which sometimes maintains the same Size for a considerable Time, without any apparent Increase: On a sudden it enlarges beyond all Conception: At first it is attended with little or no Pain, and that only by Intervals: Upon the Increase of the Tumor the Pain becomes intolerable, sometimes so violent as not to be borne without Fainting. If you apply repelling or astringent Remedies to the Part, the Disorder increases wonderfully: Inasmuch, that one Month will produce more Increase of Pain and Tumor, than a Year without any medicinal Applications. The Use of Medicine will so far irritate this Disorder, that the Skin will presently break, and form a foul stinking Ulcer.

Beginning
and Increase
of the Dis-
ease.

III. A Cancer, as well as a *Schirrus*, will arise in almost any Part of the Body; but most frequently in the upper Parts; as the Nose, Ears, Lips, and the Breasts of Women, nay sometimes of Men: A very memorable Instance of which you will find recorded by BIDLO. (*Exercit. Anat. Chirurg.*) But besides these Parts, the Gums, Fauces, and Tongue, and even the Parts of Generation are sometimes the Seat of a Cancer.

Seat of a
Cancer.

IV. The Causes of a *Schirrbus* and *Cancer* are common to both: Only these seem to have acquired some additional Acrimony. The magignant *Stimuli* of a Cancer are not only produced by the Application of digestive, acrimonious, or caustic Medicines, but they are also occasioned by sundry other Causes. That Sort of Diet is most mischievous which is most apt to produce Acrimony in the Blood. Therefore all Persons that are by Habit of Body obnoxious to Disorders of this Kind, should religiously abstain from Lard and Pork Meats. Grief and Trouble of Mind are very apt to create a cancerous Disposition of Body. It is observable, that old Maids and even married Women that do not breed, are very subject to Cancers in the Breast. This generally happens to them when they are turned of Forty Years of Age, at the Time when the menstrual or hæmorrhoidal Discharge begins to decrease or disappear: Though I have frequently known this Case happen to Persons not so far advanced in Years, even between Twenty and Thirty.

Causes.

V. The Signs of an *occult Cancer* are as follow. The Patient perceives an Itching, Heat, or pricking Pain, in or about the *Schirrbus*. The neighbouring Parts grow livid: The Tumor has an unequal Surface, increases in Size, and grows considerably harder than before: The Veins enlarge and become livid, though this Circumstance does not always happen. If the Case is an *ulcerated Cancer*, you will discover it not only by the Ulceration of the Part, by an *occult Cancer* having preceded it, but the following Symptoms will make it evident to Demonstration.

Diagnosis.

VI. A thin *Sanies* flows from the Ulcer in great Quantities: Sometimes so corrosive and acrimonious, that the Dressings seem as rotten as if they had been eaten by *Aqua Fortis*. The Stench is intolerable, especially to those who are not accustomed to it, and fills the whole Chamber. The Disorder continues to

Symptoms.

spread itself wider, the Lips of the Ulcer enlarge, are wonderfully distorted and turned in; are sometimes pale, sometimes red, purple, green, livid, black, or variegated. Pains attended with a Sensation of burning, pricking, gnawing, come on at Times with such Vehemence, that through Anguish and want of Sleep, the Patients are driven to almost Distraction and Despair, which greatly wastes their Strength: Their Appetite and Sense of Smelling entirely fail them, till at last Death delivers them from a miserable stinking Carcase. The Urgency of the Symptoms which we have recounted, depends upon the Patient's Habit of Body, and upon the Situation of the Part affected.

Prognosis.

VII. An occult Cancer, which is not attended with any considerable Degree of Pain, may be endured for a considerable Length of Time, without any great Inconvenience, by a Person endued with Strength and Temperance. But these very same Persons, by an Irregularity in Diet, or medical Application, will be subject to the same grievous Symptoms which we have just enumerated. Notwithstanding what has been said, many have imprudently boasted that they have been possessed of infallible Secrets for the Cure of Cancers: Though at the same time it must be confessed with ^a HILDANUS, and other capital Physicians, who confirm the Opinion of ^b HIPPOCRATES, and ^c CELSUS, that no Physician has yet been happy enough to discover a Medicine from which he could promise any Certainty of Cure in this Case. We have a very memorable ^d Example of this in ANNE of *Austria*, Mother to LOUIS XIV, late King of *France*, who laboured under a cancerous Breast, and was not only attended by the Court Physicians, but by almost every one in that Kingdom who had any Pretensions to the Practice either of Physic or Surgery; particularly by those that boasted of their secret Art in curing Cancers. But notwithstanding all the Attempts of Art, which the Desire of gaining a Royal Reward could excite, no Help could be obtained for her: From which we may very fairly conclude, that there is no Help to be expected from any thing but the Knife. The Hopes we may entertain from Extirpation, depend upon the Degree of the Disorder, the Urgency of the Symptoms, and the Strength and Habit of the Patient. When you shall be of Opinion that the Cancer is so deeply rooted, that it will be impossible to extirpate it entirely, it is far better to lay aside the Operation, than to torment miserable Patients without any Hopes of relieving them. For Instance, when this Case falls upon the *Uterus*, *Fauces*, *Uvula*, *Tonsils*, *Axillæ*, and *Inguina*, it is scarcely ever curable. But Cancers of the Lips, *Palpebræ*, and *Mammæ*, are extirpated with Safety, and sometimes admit of Cure: But there is great Danger of their returning. Some believe a Cancer to be contagious, though I could never observe any Foundation for this Opinion, though I have been pretty conversant in these Cases.

KORTHOLTUS's Remedy for a Cancer.

VIII. In *Ephemerid. Breslaviens. Physico-Medicis*, which were sometime since published in *High Dutch*, in several Volumes, and also in *Praxi Medicâ* NENTERI, you will find great Recommendations of a *Nostrum* of KORTHOLTUS's, which is corrosive and emetic. But I must tell you at the same time, that I

^a In *Lib. de Gangræna*, cap. VII.

non curare (sive attingere) melius est. Curati enim cito pereunt, non curati vero longius tempus perdurant.

Tom. V.

^c *Lib. V. Cap. XXVII. § 2.*

^b *Aphorism. xxxviii. § 6. quibus occulti Cancri sunt, eos*

^d See *Memoires de Madame DE MOTEVILLE*,

am informed by Men of the greatest Credit, that it is of no Efficacy in the true Cancer.

IX. When a Cancer yields to no Medicine; when it happens in old Age, or to a bad Habit of Body; when it is situated under the *Axilla*, or near large Blood-vessels, or has spread itself to a great Extent, and is of long standing; or where the Patient is afflicted with a Cancer in more Parts than one; in either of these Cases the Knife is foreign to our Purpose. For as the vitiated Parts can never be entirely extirpated, the Surgeon, by attempting the Operation, will only make Matters desperate, and hasten the Death of his Patient. Therefore the best Method of treating an incurable Cancer, which is not yet broke or ulcerated, is, (1.) To endeavour, without using any violent Means, to prevent it from degenerating into an Ulcer: (2.) To relieve and assuage the most threatening Symptoms. In this Manner we may prolong the Prospect of Death, and many other Mischiefs, by a palliative Method.

When a
Cancer is
incurable.

X. If any one is desirous of palliating this dreadful Case, he must look for Assistance, not from Medicine alone, but principally from a diligent Observation of Rules with regard to Diet: Which we have already explained at large in discoursing of a *Schirrus*. (Chap. XVI. § VI, &c.) The Patient should lose Blood in Spring and Autumn, but if of a plethoric Habit, oftener; and the Bowels should be constantly kept open. It would not be amiss also to advise the Use of *Goats Milk*, unless the Patient has a particular Aversion to it: You may give it either alone or boiled with vulnerary Herbs or Crayfish. By this Method you may very successfully prevent very dangerous Symptoms. But if notwithstanding this, violent Pains succeed, it will be proper to give him a Dose of *Opium* now and then, or to boil *Sem. Papav.* in his Drink: Or you may make an Emulsion of them. These Medicines, by giving Sleep, are excellent Remedies against Pain and Weakness. The same Method is to be observed with regard to external Treatment, which we prescribed in the above cited Place.

Palliative
Method.

XI. Almost the same Method is to be observed in treating a Cancer that is broke or ulcerated: Only in this Case the Part is to be kept clean, the *Sanies* frequently wiped off, and the Ulcer to be filled with soft dry Lint; or, in order to lessen the Pain, the Part may be anointed before it is dressed, with such Medicines as obtain most Credit for answering this Intention. The principal of these are, *Ol. Myrrhæ per deliquium, vel ejus Essentia cum Essentia Succini, vel Aqua Calcis sola, aut pauxillo Sacchari Saturni admixto. Vel,*

How an
ulcerated
Cancer is to
be treated.

- R. Aceti Lithargyrisati ℥j ss. Olei Rosacei aut Solani ℥j. m. f. in mortario plumbeo aut vitreo Unguentum, quod Nutritum appellatur, Vel,*
R. Aq. Rosar. Flor. Sambuc. Papav. erratic. ana ℥ij. Sacch. Saturni, Essent. Opii ana ℥j. Spirit. Vini Theriacal. ℥ij. M. Vel,
R. Aqua Sperm. Ranar. Solan. ana ℥ij. Plumb. ust. ℥j. Sacchari Saturni 3 ss. M.

In the Place of these you may substitute a vulnerary Decoction *ex Herb. Mar-rab. Agrimonie, Veronice, &c.* or *Succ. Solan. & Plantagin.* The Ulcer may be very easily washed with any of these at every Dressing, and the Lint may be wetted with them. But if the Pain should be very violent, you may then in-

crease your Dose of *Opium* or Essence of *Opium*, or you may moisten the Pledgits with Essence of *Opium* at every Dressing: Since it will be impossible to assuage the Pains with a less powerful Medicine. The Essence of *Opium* to be used in this Case, is not to be prepared *cum Spiritu Vini*, but rather *ex Aquis destillatis, ex Solano, Floribus Papav. Erratic.* DIONYSIUS advises a raw Piece of Veal to be laid on the Part. Dry Powder should never be sprinkled upon a Cancer, as it is customary on other Ulcers. The Dressing with *Plumbumustum cum Sem. Lini aut Psyllii Mucilagini mist.* mitigates the Pain in a surprizing Manner. Varying the Application in this Case is very useful, but we should stick most to those Remedies which seem to agree best with the Patient. Lastly, the *Aqua Vulneraria sive Sclopetaria*, commonly known by the Names of *P'Eau d'Arquebusade* prepared with *Aqua Solani*, rather than with Wine or Spirits, being laid on warm and frequently repeated, is of eminent Service.

How a Cancer is to be extirpated.

XII. When the Cancer is so circumstanced that you may venture upon Extirpation, without Danger of any considerable Mischief; you are first to administer mild cathartic Medicines to cool and correct the Acrimony of the Blood: (§ XI.) But more particularly to prepare the Patient by an exact Regimen with regard to Diet, before you attempt the Operation. The Instruments which are used in taking off Cancers of the Lips, Eyes, *Mammæ*, and Parts of Generation in the Male, you will find described below in their proper Place, when I come to treat professedly of Chirurgical Operations. The Wound is to be dressed in the same Manner which we have directed for treating other Wounds; with a digestive Ointment, and vulnerary Balsam. The Dressings should be laid on lightly, and but seldom repeated, which will greatly conduce to the Cure. When the Wound is healed, the Patient should observe a very strict Regimen with regard to Diet through the remaining Part of his Life. He should entirely abstain from all acrimonious, salt, acid, or spiced Meats: He should frequently take gentle cooling Purges, the best of which are the Purging medicated Waters; not omitting to lose Blood by Cupping or the Lancet whenever he perceives any Fulness, particularly at Spring and Fall. For if these Rules are neglected *Schirrus* and Cancer easily return.

C H A P. XVIII.

Of an O E D E M A.

An Oedema, what.

I. HITHERTO we have been treating of Tumors that arise from Inflammation, and of the ill Consequences that attend them. We proceed now to describe that Sort of Tumor which is attended with Paleness, Cold, and yields little Resistance, retaining the Print of your Finger when pressed with it, and accompanied with little or no Pain. The Name proper to this Tumor is *Œdema*, or a *Pblegmatic Tumor*. It obtains no certain Situation in any particular Part of the Body, since the Head, Eyelids, Hands, sometimes Part of the Body, sometimes the whole Body is afflicted with it. When the last mentioned is the Case, the Patient is said to be troubled with a Cachexy, *Leucopblegmatia*, or Dropsy: But if any Part of the Body is more subject to this Disorder than another, it is certainly the Feet; which are at that Time called swelled

swelled or œdematous Feet. We shall treat distinctly of them in this Place, that it may appear what is the true Nature and rational Treatment of Phlegmatic Tumors, in whatever Part of the Body they shall be found.

II. The proximate Cause of an *Œdema* is doubtless to be found in the too ^{Causes.} great Serosity or Viscidity of the Blood, which stagnates in the very minutest Vesicles of the Fat, or *Tunica Cellulosa*, and by this means stretches out the Skin with which it is immediately covered. This vitiated State of the Blood chiefly arises in Men, (1.) who are either of a cold and phlegmatic Habit of Body, or are advanced in Years: It chiefly falls upon them in cold Weather, or in the Winter, when the Inclemency of the Season heightens the Disorder of Nature. It is no wonder therefore that Persons whose Legs swell greatly in the Day, frequently find themselves much lighter and slendered in those Parts every Morning, which certainly proceed from the Warmth they receive in Bed. (2.) Another Cause of this Disorder is, *an Irregularity in Diet*, by over eating or drinking, and by the constant Use of crude, cold, and hard Meats. (3.) *Intermitting Fevers or Agues* conduce very much to this Disorder: Especially if the Patient indulges himself in an intemperate Use of cooling Liquors whilst the hot Fit is upon him, and his Thirst very urgent. (4.) This Disease frequently owes its Rise to *too plentiful a Discharge of Blood* from a Wound, from the Nose, or Lungs, by vomiting, or from the hæmorrhoidal Vessels or *Uterus*. Or, (5.) Sometimes to *Obstructions of the menstrual Discharge* in Women. Or, (6.) To *a Compression of the Vena Cava*, by the Weight of the *Fœtus* in Women far gone with Child, or by any schirrhous Body in the *Abdomen*; which greatly hinders the Return of the Blood from the lower Limbs. Or, (7.) To *too sedentary a way of Life*, or to too great an Indulgence in lying in Bed or sleeping. Or lastly, (8.) To *a Phthisis and Difficulty of Breathing*; or to any other Disorder or Fatigue of Body, which disturbs or destroys the natural Force of the Heart in maintaining the Circulation with due Vigor.

III. From what has been delivered, it plainly appears by what Signs ^{Diagnosis.} an *Œdema* manifests itself. Therefore this Observation alone remains to be added; that the harder the Tumor is, and the longer the pitting which is made by the Finger remains visible, the stagnating Fluid is in such Proportion thicker and more tenacious.

IV. *Œdematous Tumors* that come with other Diseases, as a Dropsy, Con- ^{Prognosis.} sumption, Asthma, Intermitting Fever, or with an Increase or at the going off of the menstrual Discharge, can seldom be cured but by curing the Distemper from whence they arise. *Œdematous Tumors* of the Legs are of very little Consequence in Women with Child; especially if they are naturally of a good Habit of Body: For the Pressure being taken off the *Vena Cava* by the Delivery of the Woman, the Tumor quickly disappears in Consequence. But weakly Women do not come off so well in this Case, particularly if the Tumors remain long after Delivery: For they are, in this Case, frequently the Forerunners of Dropsy, Asthma, and Death. The more inveterate these Phlegmatic Tumors are, by so much the more dangerous and doubtful are they to be esteemed. On the other hand, those that are recent and attended with no other Diseases are very easily cured. Those that are Attendants on an Intermitting Fever, are cured with much greater ease, than those which are the Consequence of a large Profusion of Blood, or of any other Weakness. Those which arise from an Obstruction

Obstruction of any natural Discharge, are cured by the Return of that natural and customary Discharge of Blood. Young Persons are more readily cured of these Tumors in the lower Limbs than old: For indeed Persons advanced in Years are generally incurable in this Case. When Tumors of the Legs and Feet are treated with improper Remedies, especially externally, Asthma and Death will, by Degrees, be the necessary Consequences.

Method of
Cure.

V. The Method of treating oedematous Tumors is surprizingly different, according to the different Causes to which they owe their Rise. Therefore we are first to make diligent Search after the genuine Cause of the Disorder before we attempt its Cure. And as from the Nature of the Distemper, the internal Parts are to be set right, we must by no means put our whole trust in external Remedies; but are chiefly to expect Help from internal Medicines prescribed by a *prudent Physician*^a. The external Method of treating these Tumors in the Legs and Feet, is usually, (1.) To have Recourse to frequent *Frictions* with warm Cloths, to be repeated Morning and Evening till the Parts grow red and hot. (2.) Then the Limbs are to be diligently preserved from the Injuries of the cold Air: For which end he may wear Stockings made of some warm Furr; and at Night he should keep hot Bricks about his Legs and Feet, to attenuate the Blood. (3.) After this you may apply a proper Bandage, which is to ascend gradually from the Feet up to the Knees: This strengthens the Limb, and prevents a Collection and Stagnation of the Blood in any Part of it. (4.) After the Use of proper internal Medicines, and the external Methods which we have just mentioned, it will be very proper to use strengthening Remedies externally. To this end you may place the Limb over burning Rectified Spirits of Wine, wrapping it up in Cloths, in such a Manner that it may receive the Steam: This will incline the stagnating Fluids to escape through the Skin, or render them fit to return into the Circulation, and at the same time restore the natural Tone to the Limb. (5.) Many, especially amongst the common People, apply, as a Family Medicine, the *Chelidonium majus*, first bruising it, and then laying it on as a Cataplasim. Others apply in the same Manner the *Perticaria acris*, either alone, or mixed with the forementioned Remedy, and from this Method they frequently find great Relief: For they are very active Medicines, and powerful Resolvents. There are still others again who use *Raphanum Rusticanum Rafum*, or *Lepidium*, which they boil in Wine and apply hot for the same end. But the most excellent Remedy to execute this Intention seems to be the Cataplasim which is prepared *ex Columbarum Fimo, Sale atque Aceto inter se invicem commixtis, calidè sæpius impositum*. Of the same Virtues are Fomentations made *ex Cineris Querni Lixivio parat. cum Aq. Fabri Ferrar. addendo Spirit. Vini uncias aliquot, Aluminisque portiunculam*. This may be applied with Stuphs, or the Legs may be bathed in the Liquor as warm as it can be well borne, twice every Day. *Aqua Calcis* is said to be of equal Service, used in the same Manner either alone, or mixed *cum Spiritu Vini & Alumine*. The following Mixture also answers the same Intention:

℞. *Spirit. Vini, Aceti Vin. ana ℥j. Alum. Crud. ℥j. ss Vitriol. ℥j. M.*

This is to be applied as we directed above. But you must carefully take notice, that after rubbing and fomenting, the Legs are to be well covered with Bandages

^a See my *Practical Compendium*, Chap. II. N. 14.

and Stockings. The Patient should drink sparingly, use moderate Exercise frequently, and be very diligent in the Use of proper internal Remedies. Sometimes the medicinal Waters, particularly those of the sulphureous Kind, are found very serviceable in this Case, but not always. GARENGEOT advises scarifying the Feet, first in the inward and middle Part of the *Tibia*; and when those Wounds are healed, afterwards to repeat it on the opposite Side: And to apply to them the *Emplastrum Norimbergense*, as a most excellent Medicine: Cap. De *Paracentesi Abdominis*. HARRIS, a celebrated *English* Physician, in *Dissert. Chirurg.* IX. relates, that he has cured the most dangerous of these Cases, *cum Croco Marte aperitivo, Cortice Peruviano mist.* Others affirm, they have done it with the *Cortex* alone: others again are confident, that this is a hurtful and dangerous Method. The best Way is, to consult some prudent Physician, who best knows how to advise you what Methods to pursue, and what to avoid.

C H A P. XIX.

Of ^aFUNGIOUS TUMORS, and DROPSY of the JOINTS.

I. **O EDEMATATA** are nearly resembled by fungous Tumors of the Joints. A fungous Tumor, what. These are Disorders of very bad Consequence, and therefore deserve a particular Disquisition. That they have been entirely omitted or slightly passed over by many Chirurgical Writers, seems to proceed from their Ignorance of the true Cause from which they arise: For whether they owe their Origin to a Collection of Blood or serous Fluids, corrupted Matter, *Pus*, *Flatus*, or to any other Cause; they could not pretend to distinguish. When we speak of a *Fungous Tumor of the Joints*, we mean that Tumor of the Limb which arises at the Joint, looks pale, is void of Heat and Pain, easily yields to the Pressure of the Fingers, but rises again instantly, like a *Fungus* upon removing the Finger, leaving no Pit behind. Though no Joint either of the upper or lower Limbs can be said to be secure from this Disorder, yet the *Knees* are most subject to it, because they abound in a large Quantity of Fat and glandular Bodies, which are concealed amongst the Ligaments and Tendons: There are several Species of this Tumor: For some are smaller, some larger, some softer, some harder, some more, some less glutinous with regard to the State of the inspissated Fluid; and as they are particularly subject to Injuries from Falls, or other Accidents. Again, some are attended with Pain, some entirely free from Sensation. ^b In some the noxious Humours are situated without the Joint, which Kind of Tumors are properly the fungous Bodies we are now treating of: But in others they are collected and retained in the Joint itself, as the *Serum* is contained in the Testicle in an *Hydrocele*, many of which I have seen and cured. This last-mentioned Disorder may not improperly be called a *Dropsy of the Joint*, and may probably be distinguished from the fungous Tumor of the Joint, by the Inlargement that ap-

^a In *England* they are known to us by the Name of White Swellings, or Scrophulous Tumors of the Joints.

^b PURMANNUS, in his *Chirurgia Curiosa*, has given us a Description of a very large *Fungus*.

pears all round the Joint; whereas the fungous Tumor is situated more on one or the other Side of it. From what has been already said of these two Cases, I think it plainly appears, that it is no difficult Matter to distinguish one from the other.

Causes.

II. The proximate Cause of fungous Tumors is, without doubt, the viscid glutinous *Serum*, which is found about the Ligaments of the Joints, and is apt to stagnate after the Ligaments have received any considerable Violence from a Fall or Blow. Sometimes the Tumor rises in the external Parts, sometimes in the Articulation itself, by which the Ligaments being weakened, the Part loses its natural Motion. But when the Nerves or Blood-vessels are greatly pressed upon by the Tumor, the Parts below are usually deprived of Nourishment, and the Joints by Degrees being greatly enlarged, the neighbouring Parts diminish and waste.

Prognosis.

III. We have already observed, that in fungous Tumors of the Joints, the Ligaments are too much lengthened and relaxed, and the natural Strength and Motion of the Limb are lessened in proportion to the Degree of the Disorder. And as the lost Vigor of the Part is very difficult to be restored, and the Tumor will not readily yield either to Suppurants or dispersing Remedies, any one will be sensible that the Surgeon has no easy Task upon his Hands, when he undertakes the Cure of a fungous Tumor upon the Joint. The Suppuration of the Part is not only difficult to bring about, but it is generally a very dangerous Attempt: For by this Means *Caries* and incurable *Fistulae* are sometimes produced, which require Amputation of the Part. When the Tumor is recent, and not very large or hard, it sometimes admits of Cure by the Application of digestive and corroborating Remedies: Whereas they will be greatly irritated by emollient Applications. But where the Tumor is large and inveterate, no Success is to be expected from any thing but the Knife: And even that is sometimes unequal to the Cure, or improper. If the noxious Fluids are contained in the Joint, they may be let out by Incision: But upon healing the Wound, the Tumor will generally return.

Cure of recent fungous Tumors by Dispersion.

IV. In order to render the Cure of recent and mild fungous Tumors the easier by dispersing Remedies, it will be best to rub the disordered Part well every Day with warm Cloths, fomenting it afterwards with *Spirit. Vini tartarificati*. This Method is to be constantly observed, till the natural Strength and Form of the Limb are restored. PURMANNUS's Fomentation is excellently callulated for this Purpose:

R. Muriae Halecum ℥ ij. Acet. Vini fortissim. ℥ j. Fol. Salv. M. ij. Vitriol. Rom. ℥ j. S. Alumin. Crud. ℥ vi. M.

These Ingredients are to boil together for half an Hour, and to be used in the Manner we have above described. When the Tumors begin to disperse, and the Parts to recover their Strength, it will be very beneficial in perfecting the Cure, to foment the Limb well several Times every Day *cum Spiritu Vini Tartarificati, vel cum Oleo Tartari fatido*; laying on the Bandages immediately afterwards to keep the Part warm, and defend it from the Injuries of the cold Air, of which it is very susceptible. Lastly, I cannot help adding a Form under this Head, by the Assistance of which I have frequently made very happy Cures of fungous Tumors:

℞. Lithar-

R. *Lithargyr.* lib. ℥. *Boli Armen.* ℥j. *Masticis,* *Myrrhæ* ana ℥℥. *Aceti Vini* lib. j. m. & coque hæc omnia per horæ quadrantem, tinctisque in ist decocto linamentis crassis calida semper & matutino & vespertino tempore in lectulo applicentur.

At the same time proper purging Medicines, Attenuants, and Sudorifics should be diligently attended to.

V. If the fungous Tumor is of long standing, and will not give way to the dispersing Remedies which have been prescribed, almost the only Hope left is, to make an Incision into the dependent and most convenient Part of the diseased Joint, taking great Care to avoid wounding the Ligaments or Tendons. You are well justified in following this Method, by the Examples of those two celebrated Surgeons^a WURTZIUS and^b PURMANNUS. By this means the stagnated Serum is instantly evacuated, if it is contained in one Cavity; but if it is contained in different Cells, it will all escape in a few Days. Tents daubed with some digestive Ointment, and sprinkled with Allom, are serviceable in this Case. Before you make your Incision, you should pull the Tumor down as low as you can with your Fingers, and make a tight Bandage above to retain it in this Situation. By this means the most convenient Part for the Incision to be made in, will lie fair; and when the Opening is made, the Serum will readily burst out like Blood at the opening a Vein, or Lymph in tapping for the *Hydrocele* or *Ascites*. When this is done, if any Tumor still remains, dress the Part with *Emplastrum Diachylum vel Oxycroceum, vel WURTZII Rubrum, vel Aqua Calcis, vel Spirit. Vini*; by continuing any of these Applications, what remains inspissated in the Tumor will entirely disperse. When the Limb is restord to its natural Shape, heal the Wound with vulnerary Balsams, diligently avoiding the Use of fatty or oily Medicines, as being very hurtful to the Tendons and Ligaments, with which those Parts abound. If the Serum contained in the Tumor is so glutinous, that it cannot discharge itself for want of Fluidity, you must throw up attenuating Injections at every Dressing. The best calculated for this Purpose are those which are prepared *ex Decocto. Agrimonie, Aristolochie, aut Alchymille cum Rosarum aut Chelidonii Melle misto*. Injections of this Kind will quickly dissolve the stagnating Serum, and disperse the Tumor.

VI. Though those fungous Tumors, which are opened with the Knife, are more readily discharged and healed, yet some Surgeons prefer the Application of caustic Medicines to the Knife, discharging the collected Serum upon the falling off of the Eschar: After which they proceed in the same Manner which we advised above. Whilst the Part is healing, in either Case, I think, it would be very proper to warm and invigorate the Ligaments and Tendons, especially when the Injury falls upon the Knee, by the Use of some nervous Ointment, or aromatic Spirit.

VII. It very frequently happens, that after you have evacuated the inspissated Serum, and cicatrised the Wound, you shall have a fresh Collection of a vitiated and corrupt Fluid, which I am an experienced Witness of. To prevent this Accident, the following Method will be serviceable. Let the Patient continue in a strict Course of proper purging, sudorific and attenuating Medicines, and

^a *Chirurg.* p. 268.

^b *Chirurg.* P. III. p. 46. *it. Chirurg. Curios.* p. 622.

keep the Wound open with Tents for a considerable Time, cleansing it every Day by throwing up an Injection prepared in the Manner we directed in the preceding Section. PURMANNUS highly commends this Manner of keeping the Wound clean, and attests, that after the sixth Time of Injecting, he has not only seen the Wound clean, but filled up with new Flesh. It will be proper also to inject *Aqua Calcis vivæ*, or *vulneraria Gallorum* sometimes; and to cover the external Part with a warm Plaster, or to foment it with some Liquor of the same Intention, especially in the Knees. This Method is recommended by that experienced Surgeon FELIX WURTZIUS, as the most likely Means of preventing the Return of the Disorder.

When an
Opening is
not to be
made.

VIII. Before I leave this Head I must inform you, that *it is not every fungous Tumor of the Joints which is so situated, that it can be opened with Safety.* For if the Tumor is of very long standing, hard, of a great Size, or the Patient is of an infirm weakly Habit of Body, you must entirely lay aside the Knife. For this Method of Treatment would produce more Mischief than Good, by laying a Foundation for new Disorders; to wit, *Caries, Fistule, and Gangrene.* As to the other Species of lymphatic or phlegmatic Tumors, which require the Knife, such as *Dropsy, Hydrocele, Hydrocephalus, and Ranula,* I shall treat more fully of them in their proper Place, when I come to describe Chirurgical Operations. In the mean time, with regard to Swellings in the Knee, consult SCULTETUS's *Observat.* 79. WURTZIUS's *Surgery*, p. 268. and MECKEEN and ROONHUYSEN, *Observ. Chirurg.*



INSTITUTIONS OF SURGERY.

PART I. BOOK V.

Of ULCERS.

CHAP. I. Of ULCERS.

I. **A**N Ulcer is a Disorder so well known to every one, that when I have mentioned the Name, it would be impertinent to illustrate it with a Description. A Definition in this Case would only serve to make the Matter more obscure. You have a very just and clear Notion of an Ulcer, when you are told, that it is a *Solution of the soft Parts of the Body and the Skin*, arising from an internal Cause, *sc.* and Inflammation, Abscess, or sharp Humours. Wounds also and Contusions, by length of Time, degenerate into Ulcers, and properly assume that Name.

II. The proper Seat therefore of an Ulcer, is, any soft Part of the Body, *sc.* the Skin, Fat, Glands, Muscular Flesh, and even the *Viscera*. If any of the hard Parts of the Body, that is, of the Bones, are ulcerated or corroded, the Disorder is rather called a *Caries* or *Spina Ventosa*, than an Ulcer. But from the Similitude there is between both Cases, I think they may very properly be treated of under the same Head, and I have therefore joined them together.

III. If you desire to know how Ulcers differ from *Abscesses*, *Contusions*, and *Wounds*, a diligent Examination into the Nature of each, will give you full Satisfaction upon this Head. Though *Wounds* and *Contusions*, as well as *Ulcers*, consist in a *Solution of Continuity of the soft Parts of the Body*, yet they widely differ in this Circumstance: To wit, Wounds and Contusions always arise from an external Cause, and are produced in a Moment: Whereas Ulcers owe their Rise chiefly to internal Causes, § I. and come on by slow Degrees. *Abscesses* are as it were the first Beginnings of Ulcers, or rather are immature Ulcers: Which is the Case when Inflammations come to Suppuration, the Skin still remaining whole. But as soon as an Opening is formed in the Skin, and the matured *Pus* discharges itself, from Abscesses they become Ulcers, whether the Skin is eroded by the *Pus*, or the Opening made by the Surgeon's Instrument.

Various
Kinds of
Ulcers.

IV. Ulcers cannot be confined to one Species, for they differ, (1.) In the Part of the Body which they infect. For sometimes they are found in the Skin, Fat, and Glands, sometimes in the Muscular Flesh. (2.) In their Size; for they are spread wide, others occupy but a small Space: Some are deep, others shallow: Those which penetrate deep, and are narrow, particularly if they are very small at their Opening, are called *Sinuses* or *Fistulae*. (3.) In their standing; whence they are called *recent* or *inveterate*. (4.) In Number and Degree of Symptoms, or accidental Disorders that attend them: Some are very mild, and are thence called *benign*: Others are *malignant*, that is, either attended with very acute Pains, or fetid, putrid, fatty, discharging great Quantities of Ichor, spreading wide, cancerous, callous, fistulous, or attended with Worms. (5.) In their Causes: Hence Ulcers are called *scorbutical*, *venereal*, *cancerous*, *pestilential*, or are said to be occasioned by *Fascination*. Lastly, (6.) Ulcers differ in their Situation, and are called *Ulcers of the Nose*, *Fauces*, *Breast*, *Anus*, and *Fistulae Lacrymales*, as they attack this or that Part.

Causes.

V. I think those Physicians amongst the Moderns, draw too hasty a Conclusion, who assert, that the principal Foundation of Ulcers is owing to a foreign acid Humour, which corrodes and destroys the Parts of the Body which it falls upon, in the same Manner that *Aqua fortis* would: Since there is no acrimonious Humour, whether it is of a salt, luxivious, alkaline, or acid Nature, but would corrode the Body, and raise an Ulcer of some kind. And, to say Truth, the stagnating Blood generally degenerates into an Acrimony of the alkaline Kind, and is by no means, according to the Opinion of some, converted into an Acid: This you may collect from the fetid Smell of Ulcers. The Physicians have pronounced an *Alkali* to be any Saltness or Acrimony, which is adverse to all Kinds of Acids, as Salt of Tartar is to Vinegar, Oil of Tartar *per deliquium* to Spirit of Vitriol. As there are many Kinds of Poisons, so of acrimonious Things, and therefore of Ulcers. The more Virulence the Acrimony is possessed of, by which the Body is corroded, so much the worse will be the Consequence of such Corrosion: The Ulcers will be the more fetid, the more dangerous, and perhaps incurable, which is the Case in Cancers. But Ulcers do not arise from Acrimony alone; but from any other Cause by which the Blood may be made to stagnate and corrupt. Upon this Principle you frequently see Tumors, Inflammations, Wounds, Contusions, Fractures, Luxations, Schirrhus, Cancer, and Caries degenerate into Ulcers: Which though they begin with very slight Symptoms, yet, either from a bad Habit of Body, Irregularity in Diet, or Ignorance in the Surgeon, they very often become extremely dangerous.

Diagnosis of
inveterate
Ulcers.

VI. Although most Ulcers may be discovered by the Sight: Yet, in order to have a thorough Knowledge into the Depth and Tendency of the *Sinus*, and whether it is accompanied with a *Caries* of the subjacent Bone, you must have Recourse to the Use of the Probe. You will learn best from the Patient whether it be recent or of long standing. From him also you may collect the Cause of the Inveteracy of the Disorder; whether it is owing to a subjacent *Caries*, to an irregular Course of Life, or to the unskilful Treatment of the Surgeon. The Ulcer is said to be *benign*, if it is recent, and attended with no violent Symptoms; if the Pus is of a moderate Consistence, whitish, without Acrimony, and of no bad Smell; and lastly, if the Patient is otherwise healthy, and of a good Constitution. On the contrary, it is called *malign*, if the Patient is of a weakly

scor-

scorbutical, or hydropical Habit of Body; if the *Pus* is too fluid, acrimonious, fetid, yellow, brown, green, or blackish, or of the Consistence of Lard. The Disorder is equally dangerous, where the Patient suffers very intense Pain, or where the Ulcer is so formed that it cannot admit of being treated like Wounds and recent Abscesses, with Digestives and vulnerary Balsams.

VII. *Ulcers* are said to be *unclean and putrid*, in which the Flesh appears corrupted, soft, white, yellow, or livid; where the Matter is thin and glutinous, and at the same time green or variegated. They are called *running* or *rheumatic Ulcers*, when there is a very plentiful Discharge of a thin *Sanies*. We term them *Corroding and Spreading Ulcers*, if the Matter is corrosive enough to destroy the adjacent Parts, sometimes slower, sometimes faster, in proportion to the Degree of Acrimony of which it is possessed. *Fistulous Ulcers* are those which penetrate deep, under the Skin, or between the Muscles, especially if the *Sinus* is wide, and the Opening very narrow. In *callous Ulcers* the internal Parts are lined with a hard and almost cartilaginous Substance.

Nature of
putrid, run-
ning, corro-
ding, fistu-
lous, and
callous
Ulcers.

VIII. *Ulcers* are termed *venereal*, when they are the Consequence of Familiarity with an infected Person, and either accompany or succeed other venereal Disorders. They are confined to no particular Part; but more frequently arise in those Parts which are the Seats of venereal Bubos, or in the Nose or Throat, sometimes also upon the *Penis*: Ulcers of this last-mentioned Part are called by the *French, Chancres*. In the other Sex the *Labia Pudendi*, or Neck of the Womb, are chiefly obnoxious to this Symptom of the Pox. *Cancerous Ulcers* are either Cancers themselves burst out, the Sign of which we have given you above, in *Book IV. Chap. XVII. § V, VI.* or very nearly approach the Nature of *Carcinomata*, if you regard the Degree of Pain with which they are affected, or the Quickness of their Increase. *Ulcers* are called *carious*, when any neighbouring Bone is deprived of its *Periosteum*, or affected with a *Caries*. But we shall treat more fully of this Case below. *Ulcers* are, by the Vulgar, believed to arise from *Fascination*, when Needles, Hairs, Threads, Rags, Egg-shells, Coals, or any preternatural Body of this Kind is found in an Abscess or Wound. But in good Truth, it is my Opinion, that not only the Sign by which the common People pretend to discover Charms, but even Fascination itself, is an Imposition which can be swallowed by none but Persons loaded with Superstition. For many Ulcers have been said to be owing to Fascination and Witchcraft, which have evidently proceeded from natural Causes.

Nature of
venereal,
cancerous,
carious Ul-
cers, and of
those which
are occasi-
oned by
Charms.

IX. Recent and benign Ulcers, like recent Abscesses, are generally attended with no great Difficulty in the Cure; especially if they happen to young and robust Subjects. The Difficulty of the Cure will arise in proportion to the Malignity of the Symptoms and the Inveteracy of the Disorder. Therefore *putrid, running, fistulous, callous, carious, and cancerous Ulcers*, require great Skill and Address in the Cure. Those quackish Persons who boast of a secret Plaster, or Ointment, for the Cure of Ulcers of ever so great Inveteracy, or attended with the worst of Symptoms, egregiously impose upon themselves and their credulous Patients. If the Patient is weak and infirm, advanced in Years, has great Acrimony in his Blood; if the Ulcer has a very offensive Smell; if the *Pus* is of a bad Colour and full of Acrimony; any of these Circumstances will render the Cure of the Ulcer very difficult. If there are many Ulcers, or if an Ulcer spreads very wide, the Discharge will be very plentiful, and reduce the Patient wonderfully. It is never good Practice to heal old Ulcers of the Legs, especially

*Prognosis, of
malignant
inveterate
Ulcers.*

especially in weak Habits, or in Persons advanced in Years. For Experience teaches us, that they are always in the best State of Health whilst this Drain is kept open in their Legs: But if you heal the Ulcer, and stop up the Discharge, the worst of Disorders follow, to wit, Pains in the Head, Vertigines, Apoplexy, Epilepsy, Difficulty of Breathing or Asthma, Diarrhoea, Dysentery, and Inflammations on the internal Parts, and many other Disorders of this Kind, till Death brings up the rear. That excellent Physician CRATO deserves to be consulted upon this Head, in his *Epistole Medicae*, where he treats this Point very judiciously. Where inveterate Ulcers dry up upon old Subjects, and the Lips grow hot and livid, there is immediate Danger of *Sphacelus* and Death itself. The Cure of inveterate Ulcers is much easier in young and robust Subjects; but you will always find it a useful and indeed necessary Observation to you, that in Ulcers of this Kind, you are not only to remove the immediate Cause of the Disorder, but you are also to restore the Blood to its pristine Purity: And in doing this you will usually meet with great Difficulty. Therefore if the Disorder is very inveterate, and the Patients are tired with the continual Use of Medicines, and with the strict Regimen to which they are enjoined, it is no wonder if these Ulcers often fail of a Cure, even in robust Persons.

Prognosis, of venereal, fistulous, callous, carious, and cancerous Ulcers.

X. *Venereal Ulcers* cannot be cured till you have thrown the venereal Poison out of the Body by proper Remedies: Till you have done this, external Remedies are to no purpose. *Fistulous, callous, and carious Ulcers*, are never cured without the Knife: For if you heal the Ulcer and bring on a Cicatrix, it will burst out again, and afflict the Patient with greater Vehemence. A Caries, especially if it is large and situated in the Joint, will bring on so large a Discharge of Matter, that if the Limb is not taken off in Time, the Patient will be entirely run down. This will appear very plain to you when you read what will follow in its Place, on the *Caries* and *Spina Ventosa*. The same may be said of cancerous Ulcers: For if the Part affected is not taken off, there remain no hopes of Cure, as we declared above, treating of a *Cancer*. But even after taking off the Part, Cancers frequently return, and entirely destroy the Patient. When Ulcers fall upon the *Viscera*, they are generally deemed incurable, because out of reach, both of the Hand and of immediate medical Applications.

Cure of recent Ulcers.

XI. The Method of treating Ulcers differs greatly according to the different Nature of the Disorder. When the Ulcer is quite recent, it may be treated as a recent Abscess or Wound. First, therefore it is to be cleansed, then to be filled with new Flesh, and lastly to be covered with an even Cicatrix.

(1.) How the Ulcer is to be cleansed.

XII. The Ulcer, if recent, is to be cleansed in the following Manner: First, the Matter is to be discharged; if it does not flow freely enough of itself, you must press it gently with your Fingers: If there is a deep *Sinus*, you may cleanse it with an Injection, or, if it lays fair enough, with Lint. Any small Membrane or fatty Body, that remains corrupting at the Bottom of the Ulcer, will readily enough cast off afterwards, at the Removal of every Dressing, which should be a digestive Ointment spread upon Lint, and secured upon the Part with *Diachylon*, *Diapalma*, or any other Plaster of that Kind, covering the Whole with proper Compresses and Bandages. This Method is to be continued till the Ulcer appears to be entirely cleansed, that is, till the Fundus of it becomes florid, and it appears to be filled with new Flesh.

XIII. Hav-

XIII. Having proceeded thus far, the next Intention is, to fill the Ulcer with new Flesh. This Intention is satisfied with those Medicines which are vulgarly called *Sarcotics*. The best of this sort appears to me to be the common *Unguentum Digestivum*: For where there is no remarkable Impediment, I have never found it necessary to use any other sarcotic Remedy than this. It is not easy to say what should induce almost all Physicians to cry up certain balsamic Remedies as having a peculiar Virtue in generating new Flesh. Besides, our Digestive is endued with a true balsamic Power: but to say the Truth, the Generation of new Flesh is not so much owing to the Use of any particular Medicines, as to the Benefit of Nature. The whole Business of the Surgeon in this Case is, only to remove any thing that may impede the Cure. If any shall think that the *Unguentum Digestivum* is not equal to this Intention, they may have my free Consent to substitute in its room *Balsamum Arcæi*, *Balsamum Peruvianum*, *Balsamum de Mecchâ*, *Balsamum Sulphuris*, *Essentia Myrrhæ & Aloës*, *Oleum Myrrhæ per Deliquium*, *Oleum Ovorum*, or any vulnerary Balsam of this Kind, 'till the Wound is entirely healed.

(2) How the Ulcer is to be filled up.

XIV. If the Ulcer penetrates very deep, so that you can neither reach the Bottom of it with your Eye, nor apply your Medicine to it, it will then be proper, at every Dressing, as soon as you have pressed the Matter out of it, to inject some cleansing healing Liquor to it; such as *Decoctum Agrimonie vel Aristolochie cum Melle Rosarum*, vel & *Myrrhæ atque Aloës Essentia mistum*; or that which BELLOSTE cries up, in his *Hospital Surgeon*, *Decoctum ex Nucum Foliis cum admixto Saccharo*. This Method of injecting is to be continued till the Bottom is entirely healed: Afterwards you may proceed to fill up the Ulcer in the Manner we advised above.

What is to be done in deep Ulcers.

XV. The Ulcer being filled up with new Flesh, it remains that we bring on a proper Cicatrix. This is best done by dressing the Part daily with dry Lint, till the Cicatrix is formed. But if, notwithstanding this Method of dressing, the Flesh becomes luxuriant, and the Ulcer is moist, it must be sprinkled with drying Powders, ex *Mastiche*, *Thure*, *Sarcocollâ*, *Colophonîâ*, *Lapide Calaminari ac Tutîâ*, covering it with dry Lint, and securing all with some Plaster, till it is entirely healed. But if the luxuriant Flesh has grown above the Skin, the best way is, to eat it down with *Vitriolum Cæruleum*: Or if that is not strong enough, you may use the *Pulvis ex Precipitato Rubro atque Alumine usto* till it becomes quite even. Then you may proceed as directed above.

(3) How the Cicatrix is to be formed.

XVI. Lastly, it is scarce possible to say what great Relief the Patient will receive from observing a proper Regimen with regard to his Diet. Practitioners in Surgery have in all Times observed, that Ulcers of the most malign Kind have been sometimes cured by this means, almost without the Assistance of any other Remedy: Whilst on the other hand the most benign Ulcers have so far degenerated, as to become altogether incurable by an irregular way of living. In this Case therefore, the Patient should most diligently avoid all acrimonious, salt, acid, fatty, or heating Meats, or those that are hard of Digestion; according to the Directions which we gave you above when we were treating of *Wounds*. (*Book I. Chap. I. § XLV*, and the following.) If your Patient already labours under a bad Habit of Body, which obstructs the Cure, it is your Duty to call for the Assistance of some skilful Physician, that may take off the constitutional Complaint, by prescribing proper internal Medicines.

A proper Regimen to be observed.

CHAP. II.

Of the Method of treating *FISTULOUS CASES.

The Cure of
Fistulæ per-
formed,
(1.) By
cleansing.

I. WHEN you discover, either by your Eye or the Probe, that Ulcers are attended with *Fistulæ* ^b not yet become callous, your readiest Way of curing them is, to lay them open with the Knife to the Bottom, if you can do it with Safety, and afterwards cleanse and heal them. But since Patients are very unwilling to consent to the Use of the Knife, you may cleanse them with a proper Injection, or dress them with *Ung. Digestivum* upon Lint, as we advised in the foregoing Chapter. Many Surgeons are for conveying their Medicine to the Bottom by the Assistance of *Tents*; but as they are very apt to do Mischief by their Hardness, or too great Length, bringing on a *Callus*, Inflammation, or too great Flux of Humours upon the Part: Therefore I think it most adviseable either to throw them entirely aside, or at least to guard as strongly as possible against any of these Inconveniencies, by making them very soft, and as short as the Case will admit of. BELLOSTE, and MAGATUS before him, both Men of great Name in Surgery, have been so offended at the mischievous Abuse of *Tents*, that they have absolutely forbid the Use of them: And I am so far from disagreeing with these Authors, that I readily join with them in Opinion. I think the Use of *Tents* is never to be justified, but where the Opening of your *Fistula* is so small, that you are in constant Fear of its healing: And even in this Case your *Tents* can scarcely be too short, and should be made of the softest Materials.

(2.) By
Pressure.

II. The next Thing to be observed in treating *Fistulæ* is, to press the *Fundus* as near to the Opening as possible. When the Ulcer is cleansed, and the proper Dressings applied, you must clap a small Compress, or a slip of Plaster doubled up in the Form of a small Compress, upon the Part where you judge the *Fundus* of the *Fistula* to be seated; securing all with a Bolster, Plaster, and Bandage, as usual. In rolling up, the best Method will be to place the Beginning of the Roller upon the *Fundus* of the *Fistula*; or at least to make your fastening tight upon that Part. This will direct the contained Matter towards the Opening, and the Bottom will heal before the Rest of the *Sinus*. This happens best in *Fistulæ* of the upper or lower Extremities; especially if the *Fundus* is in the upper Part of the Limb, and the Opening in the lower Part.

III. When *Fistulæ* penetrate so deep that you cannot come at the Bottom of them with your Dressings, you must inject such sort of Liquors as we advised in the foregoing Chapter. You may also very properly add the following:

R. *Ung. Digestiv. ex Terebinth. & Vitell. Ovi parat.* ℥j ss. *Mell. Vulgar. vel Rosar. vel Chelidon.* ℥j. *Spirit. Vini Vulgar.* ℥ix. M. Vel,

R. *Decoct. Scord. vel Abrotan. vel Agrimon.* ℥viii. *Spirit. Vini Simpl.* ℥iij. *Elixir Proprietat. vel Essent. Myrrh. & Aloës* ℥j. *Mell. Rosar.* ℥j. M.

These are to be injected at every Dressing, and the Opening of the *Fistula* should be kept close, that the Medicine may be retained as long as possible, which will

* See FABRIC AB AQUAPENDENTE, MARCHETTI, and a Treatise by ASTRUC, who treat fully and judiciously on *Fistulæ* of the Anus.

^b In England we call this Case a *Sinus*, never a *Fistula*, till it becomes callous.

hasten the Agglutination of the Part: Afterwards you are to proceed as we directed above, treating of *Ulcers*, Chap. I. § XIII. and the following.

IV. If the Method of Cure, which we have hitherto described, is unequal to the Intention of cleansing and healing, you will find greater Assistance from the Knife than from any other Remedy; and that chiefly where the *Fistula* tends downwards, or takes a very irregular Course, so that the *Fundus* of it cannot be pressed toward the Opening. In this Case, you must lay open to the bottom. Seldom cured without the Knife.

V. You should gently pass a grooved Probe or Director down the *Fistula*, and directing your Knife down the Groove, lay open the Flesh and common Integuments as far as you think safe and necessary. All the Sinuses of the *Fistula* being laid open, a free Passage is made for a Discharge of the corrupted Matter, and you can come at the diseased Parts with your Remedies. This Operation may be performed without the Use of a Director, if your Knife has a Button at the Point. (See Plate V. Fig. 4 and 5.) Some divide the Flesh with a *strong Pair of crooked Scissors*. (Plate I. Fig. D.) But this Method of cutting is attended with far greater Pain and Inconveniency than the other, except the Skin and Flesh are exceeding thin. Incision how to be made.

VI. If the Operation is succeeded by a large Discharge of Blood, which frequently happens; at the first Dressing you must fill up the Wound with dry Lint: Afterward you may dress with *Unguentum Digestivum cum Ægyptiaco, vel Præcipitato Mercurii Rubro*, till the Wound is cleansed. Every thing else is to be done as we advised above, treating of recent *Ulcers*. The Method of treating *Callus*, *Caries*, and those sort of Disorders which attend *Fistulæ*, shall be delivered separately below. CELSUS Book VII. Chap. IV. upon *Fistulæ* in general, and particularly on the *Fistulæ Costarum, Ventris, & Ani*, deserves a diligent Perusal. Consult likewise SCULTETUS's *Armament. Chirurg.* and MUYS's *Podalir. Rediviv.* p. 41, 42. What to be done after the Operation.

CHAP. III.

Of the Method of treating STUBBORN ULCERS.

I. **H**ITHERTO we have treated of mild and well-conditioned *Ulcers*. It follows that we now describe *Ulcers* of a more malignant Nature, which will not admit of a Cure by any of the Methods we have hitherto laid down; From the Stubbornness of their Disposition they are called in the medical Schools, *Ulceræ Dysepulotica, Chironia, Cacoëthica, Rebella, Contumacia*. No Man in his Senses will deny that they have all their proper Causes to which they owe this bad Disposition. These malign *Ulcers* usually appear in Subjects of a bad, scorbutical, cachectical, and hydropical Habit of Body; or where you have the Pox, a *Caries*, or *Callus*, where there is great Acrimony of Blood, or a Cancer at the Bottom of the Case. Whoever expects to be attended with Success in treating these Cases, should diligently search out and extirpate, if possible, these Causes of the Disorder. But this in most Cases is so difficult, that it will foil the most experienced Surgeon or Physician: Nor will quackish

M m

Empirics

Empirics get any Credit here, let them boast ever so long of the seceret Virtues of their famous Plasters and Unguents.

(1.) When there is a bad Habit of Body.

II. When you can discover nothing of a *Fistula*, *Callus*, *Caries*, putrid Flesh, or of Worms concealed in the Ulcer, it owes its Obstinacy to the bad Habit of the Patient, either from a Redundancy of a glutinous, acid, acrimonious, or bilious Quality in the Blood; or from some venereal Taint; or from Irregularity in Diet; or, in Women, from an Obstruction of the menstruous Discharge; in Men, of the Hæmorrhoids. In order to correct this vitiated Habit of Body, you must not only have Recourse to internal Remedies, but must also insist strongly on a strict Regularity in Diet. This is of so great Consequence, that I have seen the worst of Ulcers yield to a * proper Regimen of Diet, without the Use of one internal Remedy; only cleansing them daily with proper Medicines, or dressing them with any common Ointment, Oil, or Balsam, covering the Dressing with any Plaster in Use, as the *Emplastrum Saturninum vel Diapompholygos*; or indeed with the simple Application, of a Plantain Leaf, or Birthwort. With regard to eating and drinking, those Things which set lightest upon the Stomach should be preferred, and should be given in very small Quantities at a Time. For every thing that is too salt, acrimonious, acid, hard, or crude; all sorts of Fat, Lard, or Swines Flesh, every thing even of the lightest Kind taken intemperately, must be looked upon as Poison in these Circumstances. Persons of a sanguine Habit should avoid warm Things: Those of a phlegmatic cold Habit, cooling Things. A proper Regimen or Abstinence is very much assisting in the Performance of the Cure, by attending diligently to the Application of proper external Remedies. Therefore the Ulcer should be kept very clean; that the corrupt Matter, by lying long upon the Part may not get an additional Acrimony, and so occasion the spreading of the Disorder. After it is well cleansed, it is to be dressed with *Unguentum Digestivum*, to which may be added, *Myrrha Mastiche, aut Colophonia*; or a Decoction *ex Juglandi Foliis cum injecto pauco Saccharo*; or *Decoctum Viridis æris cum Vino*. In some Cases, *Spiritus Vini Simplex, vel aqua Calcis cum Linimentis immissa, vel Lapide Medicamentoso CROLLII Roborata*, has great Power in healing and drying up Ulcers. If you discover any *Sinuses* or *Fistulæ*, they are to be laid open; and to be cleansed afterwards in the Manner we taught above, and to be healed with *Balsamum Peruvianum, Copaibæ, Sulphuris Terebinthinatum*, or with any other agglutinating Medicine. Lastly, if internal Remedies are not neglected, there is no doubt but that the very worst of Ulcers may generally be cured.

(2.) Running Ulcers.

III. When these stubborn Ulcers are accompanied with a large Discharge, there is Reason to apprehend that the Blood abounds with too large a Quantity of thin acrimonious Serum; and they are from thence called *Rheumatic Ulcers*. This cannot be drawn off more properly than by cathartic Medicines. Where the Strength will admit of it, your Intention may be executed by prescribing Cathartics and Diuretics, to be repeated frequently; at the same time cautioning your Patient against drinking too freely. *Millepedes præparati, Essentia Succini, Myrrhæ, Balsami Peruviani, Tinctura Tartari, Tinctura Antimonii tartarifata*, or any other Tinctures or balsamic Essences, of known Virtues for promoting the Secretion of Urine, are very properly prescribed in this Case.

* Amongst many others, consult DOLÆUS in his *Encyclopædia* upon this Subject.

Large.

Large and frequent Draughts of small Liquors, which are frequently the Causes of these Disorders, are diligently to be avoided. On the contrary, strong Ale, old Wine is to be used, but sparingly, for common Drink at Meals: But the Patient should drink nothing between Meals. With regard to a proper Choice for Diet, those Meats are best which have the fewest Juices in them, and are most roasted: Flummery, Calves Feet, and Calves Foot Jelly are very proper Diet. The external Medicines after proper Evacuations, should be those that obtain the greatest Reputation as Dryers. The principal of these are, *Aqua Calcis*, *Lapis Calaminaris*, *Tutia preparata*, *Creta*, *Mastiche*, *Tbus*, *Colophonium*, & *Cinnabaris Nativa*. When you have sprinkled any of these finely powdered upon the Ulcer, you are to lay over it the *Emplastrum Diapompholygos*, *Saturinum*, *vel de Lapide Calaminari*.

IV. Ulcers which spread and corrode the neighbouring Parts, are in the Medical Schools called *Phagedænic Ulcers*, and betray a great Degree of Acrimony in the Blood: which is to be tempered as much as possible by the Physician, by the Use of lenient Medicines. The principal among these are, *Decocta ex Rad. Chin. Sarfaparill. Symphyt. Polypod. Lignit. Scorzon. Lapath. acuti, Herb. Malv. Alb. Hyperic. Sanicul. Agrimon. Marrub. Alb.* and the like. With regard to Diet, you may observe the Directions we gave above at § III. All seasoned Meats are bad in this Case. The Patient will receive great Relief by taking a purging Medicine sometimes with the Addition of some *Mercurius Dulcis*: This will not only lessen the foul Discharge of the Ulcer, but will also destroy the Acrimony of the Blood, and forward the Cure. The same external Remedies are to be used here as we recommended at § II, III. especially with the Addition of Mercury. The Use of them is to be diligently observed, till the Cure is perfected.

V. *Cutaneous Ulcers* that attack the Skin of Adults as well as Infants, particularly about the Face, approach very near to the Nature of *Phagedænic Ulcers*. For they not only arise from an Acrimony in the Blood, but are apt also to spread abroad. Therefore in both these Cases, those Medicines will prove most effectual which keep open the Bowels, and soften the Acrimony of the Blood. (§ III and IV.) Adults in particular should be advised to drink freely of what we call the Decoction of the Woods, or *Decoctum Radicis Lapathi acuti, aut Herbae Fumariæ*. Either of these Decoctions should be drank by the Patient to the Quantity of ℥ viij. or ℥ x. three or four Times in a Day, as hot as he can bear it. The first Draught should be taken in Bed, and a Sweating should be endeavoured to be raised. To these you may very properly add *Essent. Fumariæ, Lignorum, Succini, vel Tinctura Antimonii tartarisata ad guttas xxx vel xl.* You may also prescribe absorbent Powders to be taken with these Decoctions, *ex Antimonio & Flor. Sulphur. parat.* A proper Regimen of Diet should be strictly observed in this Case. In *Infants Cases who are yet at the Breast*, you should prescribe Medicines that will constantly keep the Body open and alleviate the Acrimony of the Blood: And at the same Time the Mother or Nurse should observe the Course we have prescribed above, and be very exact in her Diet. With regard to external Application, you will receive great Benefit from *Oleum Tartari per Deliquium*, if you dip a Pencil or Feather into it, and dawb the Part three or four Times every Day, either with this alone, or with the Addition of *Oleum Olearum atque Cerae*. Over this you must lay a Plaster, as the *Empl. Saturninum*,

turninum, vel de Minio, vel de Spermate Ceti cum Camphora, to correct the Acrimony, and to prevent Injuries from the external Air. If the whole Face should be affected, which is frequently the Case in Infants, a Plaster will be very improper: But you may make a Linen Mask, such as we described above, treating of Burns. You will find the Use of the following Medicines in this Case, by no means to be despised; *Ol. Philosophorum cum Oleo Ovorum, necnon Aqua Calcis, vel & Aqua ex edulcoratione Antimonii Diaphoretici*: The Ulcer should be daily washed and cleansed with one of these. If you please, in the room of these you may anoint the ulcerated Parts with *Unguentum de Lithargyrio vel Diapompholyg. vel de Enula*, with which in very stubborn Cases may be mixed *Argenti Vivi vel Mercurii Præcipitati Rubri portiuncula*. If these Ulcers are attended with a large and foul Discharge, it will be proper to sprinkle them with some absorbent or drying Powders, as *Pulv. Tutie, Lapid. Calaminar. Cerussa, Creta, &c. cum Cinnabari Nativâ, aut Præcipitato Rubro mist.* Or you may work any of these up into an Ointment *cum Cremore Lactis*, and use it as such.

(5.) Cancerous Ulcers.

VI. *Cancerous Ulcers* are the most grievous of all the corrosive Kind. In these Cases the same internal and external Remedies are to be used which we directed for the ulcerated Cancer; (*Book IV. Chap. XVII. § XII.*) Nevertheless, according to the Opinion of that great Physician and Surgeon M. A. SEVERINUS, there is more to be expected from manual Operation than Medicine in this Case: For many have been cured by the Knife or actual Cautery, where Medicine has availed nothing. But whenever you shall think it adviseable to use the Knife or Cautery, remember that you go to the Bottom, and leave no Part of the diseased Matter behind you: If you should, all your work would be in vain. Some prescribe here an *Aqua Phagedænica* made in the following Manner: *R. Aq. Calc. Viv. ℥j. Mercurii Sublimati 3 ℥. M. aut hujus loco Mercurii Præcipitati Albi 3j. vel 3j ℥.* which they apply upon Lint. Some make this stronger of the Sublimate; others add *Spirit. Vini 3j. vel 3ij.* In the room of the Sublimate I have frequently substituted with Success, *Mercurius Dulcis*, mixed with *Aq. Calcis*, which is a much safer Method. Digestive and balsamic Ointments are to be avoided in Cancerous Ulcers, as not only foreign to the Purpose, but extremely mischievous.

(6.) Putrid and fetid Ulcers.

VII. When Ulcers are *putrid* or *fetid*, this Circumstance arises either from the Patient's very bad Habit of Body, or from the Negligence or Unskilfulness of the Surgeon. Therefore it is the Business of the Physician to correct the Habit, by the Administration of proper internal Remedies, and of the Surgeon to clean the Ulcer frequently, especially if it is attended with intense Heat. For where Wounds are dressed and cleansed but seldom, which must frequently happen in the Army after smart Engagement, where great Numbers are wounded, it can scarce happen but that the injured Parts will be annoyed with Heat, Putrefaction, or Worms. You cannot more readily prevent these Inconveniences, than by carefully dressing the Parts with *Unguentum Digestivum cum Aegyptiaco seu Fusco WURTZII permixtum; aut Aqua Phagedænica; aut Mercurius Præcipitatus Ruber, vel solus, vel cum Alumine usto mistus, vel cum Unguento Digestivo subactus.* These Dressings are to be continued till the putrid Flesh separates and leaves the *Fundus* of the Ulcer with its own natural rosy Colour. Whilst this is doing, it will be proper to cover the Part with Lint dipped in Spirits of Wine, which is a very powerful Remedy against Putrefaction.

When

When the putrid Parts are cast off, you must proceed in Healing as you do in other Cases: But Myrrh should be particularly added to the healing Medicines, as a most excellent balsamic. The Surgeon ought always to take Care in this Case to call in a skilful Physician, who, by proper Remedies, may keep up his Patient, and preserve him from sinking before the Cure is perfected. Ulcers attended with Worms are to be treated in the same Manner: For whatever prevents Putrefaction, will destroy Worms.

VIII. Some Ulcers are so very malignant and obstinate, and notwithstanding they have no Alliance with any venereal Taint, yet they will not yield to any of the foregoing Remedies. When this happens, the only Method of Cure is, by administering mercurial Medicines, or raising a gentle Ptyalism, as I have frequently experienced. For some Men's Blood is so foul, that their Ulcers will not even be palliated, much less cured, without the Assistance of Mercury. But if they should be attended with any venereal Disorders at the same time, the Use of Mercurials will then be absolutely necessary, as we shall shew in the next Chapter.

Some Ulcers require Salivation.

CHAP. IV.

Of the Method of treating VENEREAL ULCERS^a.

I. VENEREAL Ulcers, as we have already declared, are almost always situated in the *Inguina*, after the Suppuration of venereal *Bubos*; or, in the *Prepuce*, *Frænum*, or *Glans Penis*, which is usually termed a *Chancre*: In Females they are frequently situated upon the *Vagina*, or *Labia Pudendi*. Sometimes the Nose, Palate, Lips, Fauces, Tongue, and *Uvula*; sometimes the Os *Frontis* and other Bones of the Head, and elsewhere, are subject to them. If they are neglected or ill-treated, one Ulcer of this Kind will produce an universal Pox. Therefore the principal Intention to be observed in this Case is, to expel the venereal Poison by proper Remedies, both internal and external.

Seat of Venereal Ulcers.

II. The Cure by internal Medicine, is to be performed by the Administration of purging Powders or Pills mixed with *Mercurius Dulcis*. You may also advise your Patient at intermediate Times to drink Decoctions of the Woods, or to take *Essent. Lignorum*, *Pimpinell. Alb. Succin. Tinctura Antimonii*, &c. in a proper Vehicle. These Medicines have great Efficacy, if you take them before you rise in the Morning, and encourage a moderate Sweat. A strict Regimen to be observed in Diet, is very necessary. Wine, and all vinous or spirituous Liquors, Aromatics, Spices, Salt, acrimonious or acid Things, are Poison in these Circumstances. If the Disorder has acquired so great a Degree of Inveteracy, that these Medicines are not equal to the Cure; you must have Recourse to the strongest Sudorifics, especially to strong Decoctions of the Woods: Or you may give Mercury in such Quantities as to raise a Salivation, by which you will cure both the Ulcers and the Pox which was the Cause of them.

Internal Treatment.

III. Whenever the Ulcers are situated in the Mouth, *Uvula*, Fauces, Tonfils, or Tongue, external Remedies become necessary as well as internal. The Patient should frequently use a Gargle, made *ex Decocto Lignorum, vel simplicis, vel melle*

External Treatment.

^a On this Subject read ASTRUC *De Morbis Venereis*.

Rosarum temperato. The vitiated Part should often be touched *vel Aqua viridi HARTMANII, vel Rosarum melle cui ad Lenem usque acorem, Spiritus Vitriolis pauxillum instillatum est*: After this it is to be healed, *per Essent. Succini et Myrrhæ, vel per Oleum Myrrhæ per Deliquium.* If the Ulcers appear on external Parts, it will be proper to destroy them with *Unguentum Digestivum aut Basilicon Mercurio vel vivo vel albo aut rubro præcipitato permixtum*; these Dressings are to be covered with the *Emplastrum de Ranis VIGONIS*, or with the *Diachylon cum Mercurio.* When the Ulcer is cleansed, you may dress with the Essences we advised above, or sprinkle it with the absorbent Powders we have so often recommended, (see *Chap. I. N. XV.*) but you must add a small Portion of red Præcipitate. An equal Power with the foregoing, in cleansing and healing these Ulcers, is held by the *Aqua Phagedænica, vel Aqua Calcis Mercurio dulci imprægnata.* Either of these may be applied frequently every Day, touching the Part sometimes with the *Lapis Infernalis*, or red Præcipitate. When the Ulcer is thoroughly cleansed, you may heal either after the Method recommended by HARRIS in *Dissertat. Chirurg.* that is, with a simple Ointment composed *ex Mercurio vivo cum Tereb. q. s. subactum*: Or you may use t

R. Ung. Mundificativ. vel Diapompholyg. Mercur. crud. tinct. ana 3j. vel 3 ss. M. in Mortario Vitreo.

R. Amalgam. Mercur. et Stanni 3j. Bol. Armen. 3ij. f. Ung.

If at the same time you have a *Caries* of the Bone, you Remedies which we shall describe below at *Chap. VIII.* *bio vel oleo Caryophyllorum, vel Aqua Phagedænica, vel Spurius solutus fuerit*; or lastly, if you can do it with *Scalpel* and *Cautery.* Sometimes, when these Ulcers fall upon the particularly on the *Inguina*, they spue out such large Qu all the Medicines you can invent, for cleansing or drying thing. This is occasioned by the Rupture or Erosion of In this Case, we should try what we can do by the Appl presses and a tight Bandage. But if these afford you no Assistance, you must call the actual Cautery in Aid, and apply it frequently, with caution, to the vitiated Parts.

IV. If venereal Ulcers of the *Penis*, or its *Glans*, are negligently treated, and universal Pox will frequently be the Consequence; the *Urethra* will often be perforated in various Places, and the Urine be discharged as through a Sieve. Sometimes the whole *Glans* and *Penis* will be eaten off, or so miserably afflicted with *Schirrrhus* and *Cancer*, that you will be forced to extirpate them with the Knife. When the Nose is affected with these Ulcers, it is frequently demolished by them. The Disorder in this Part is called *Ozæna*, of which we shall treat more fully when we come to describe *Chirurgical Operations.* Sometimes the Palate with its Bones are so eroded and perforated, that an open Communication is made between the Mouth and Nostrils; that the fluid Part of our Aliment makes its Way out at the Nose. These Passages can scarcely ever be closed again, especially if they are large: But when the Extremities of them are healed, they may

^a In this I have followed RUYSCH, *Obs. Chirurg.* 41. with Success. *Obs* 30. et DOEBEL. *Hist. Penis Cancrofi.*

^b Consult RUYSCH

be

Venereal
Ulcers at-
tended with
great Dan-
ger.

IMPRISONMENT OF AN AMERICAN BY THE AUSTRIAN GOVERNMENT.—Mr Charles L. Brace, son of J. P. Brace Esq., of this city, who has been engaged the last year in a pedestrian tour through Europe, was imprisoned May 28, in Gross Warden in Hungary, under the false accusation of being one of the Democratic Revolutionary Committee and an agent of Ujassy. Mr. McCarty, our Minister at Austria, is making efforts for his release. He has written to our Government for their interference.—*Hartford Courant.*
"Well.—The Lockport Courier of the 28th inst. says:—There is but little wool offered, and prices have declined from 3 to 4c. This is what has been expected, as the prices which have been paid are higher than could be sustained."

be closed with a small ^a Plate of Silver or Gold. The Tonfils, the external Coat of the *Uvula*, and the whole *Uvula* are very frequently destroyed by the Virulence of these Ulcers. Decoctions of the Woods and Mercurials are the principal Antidotes to this Poison. Lastly, the *Cranium* itself, particularly on the Frontal Bone, is frequently, as I have often seen, so eroded and perforated by a *Caries*, that the Brain lays bare, and you may plainly see the Pulsations of the Arteries; from whence arise grievous Symptoms, and frequently Death, unless timely prevented by a proper Method of Cure.

C H A P. V.

Of CALLOUS ULCERS.

I. **T**HE Cure of a *Callous* Ulcer is attended with great Difficulty: To say the Truth, it will admit of no Cure till the *Callus* is extirpated. ^{A recent Callus how to be treated.} A *Callus* may be extirpated three Ways. The mildest Method which is to be used to a recent *Callus*, that is not yet become very hard, is performed by *corrosive Medicines*, and those of the mildest Kind. Amongst many others you may use *Alumen ustum*, *Præcipitat. rub.* either separately, or mixt in equal Proportions, or made up with *Unguentum digestivum*, or *Basilicon*. The *Unguentum Ægyptiacum seu Fuscum* WURTZII will answer this Intention, especially if you add a little *Præcipitatum rubrum* to it. If the *Callus* does not yield to these Applications, you may destroy it with *Lapis Infernalis* or *Butyrum Antimonii*. The same End is also well answered by the Medicine which is made by a Solution of *Argentum Vivum in Spiritu Nitri vel Aqua Forti*.

II. LE DRAN has taught us a still milder Method of destroying Callosities, ^{LE DRAN'S Method.} in *Observat. Chirurg. N. CXV. Tom. II.* which is as follows: For four or five Days he applies a Plaster, made *ex Emplastro Diachyl. cum Gummis, et Vigonis cum quadruplici Mercurio, ana*: And this he renews Morning and Night, in order to soften the *Callous* Lips in some Measure. After this he makes frequent Incisions that pass so deep as to penetrate through the whole Thickness of the *Callus*, and stops the Blood that succeeds these Incisions with dry Lint. Then he applies the same Plaster again to the Ulcer, so that it may touch the naked incised Lips. After about four Days he repeated the *Scarifications*, and this to a third or fourth Time, if it is necessary; that is, if they are not destroyed before. By this Method he affirms, that Callosities by Degrees give way, and a *Cicatrix* will succeed, without the Use of any other Remedy. I have often tried this Method, and with good Success.

III. If *Callous* Ulcers are accompanied with *Fistulæ*, then the Sinus must be laid open, before we attempt to destroy the *Callus*, as we advised above when we treated professedly on *Fistulæ*: ^{When Fistulæ are accompanied with Callus.} After this the *Callus* is to be consumed in the same Manner as we directed above. But if we shall think the Use of the Knife unsafe, or if the Patient will not admit it, it will be proper to form Tents, and daub them with *Unguentum Ægyptiacum vel Fuscum* WURTZII, and thrust them up the Sinus. By this Method a *Callus*, that is not of long standing may be

See Part II. Operat. on the Palate.

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tule are ac-
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See Part II. Operat. on the Palate.

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destroyed; especially if you dip the End of the Tent in *Præcipitat. rub. Lapid. Infernal. vel Butyr. Antimonii*, before you pass it up the *Sinus*; and continue this Method till the *Callus* is destroyed. But when you cannot reach the *Callus* with the corrosive End of the Tent, you may use the following Method. You may inject *Aqua Phagedænica*, or a Solution of *Ung. Ægyptiacum aut Fuscum WURTZII in Spiritu Vini*, up the *Sinus*, and closing the Aperture, confine it as long as you can conveniently; repeating it as you shall see Occasion. When you have removed the *Callus*, the Ulcer may be cured in the Manner we have directed above *Chap. II.*

When the
Callus is
hard.

IV. Sometimes you will be obliged to use the Knife; as in *callous Ulcers* or *Fistula*, that are of long standing, and have formed Variety of *Sinuses*, where you can do nothing with corrosive Medicines: Or, where they affect and corrode the Nerves, or Veins and Arteries, and bring on violent Convulsions, or Hæmorrhages, before they affect the *Callus*. In this Case, the safest Way is to lay open the *Fistula* in the Manner we described above, (*Chap. II. N. V.*) taking great Care not to wound Nerves, Tendons, or Arteries. When you have laid open the *Sinuses* of the *Fistula*, you may presently destroy all the *Callous* Bodies, either by the Use of Corrosives, or by LE DRAN's Method, recommended at *N. II*; healing the Ulcer afterwards in the Manner we have already advised.

How a very
bad *Callous*
Ulcer is to
be treated.

V. Lastly, if even this Method of Treatment shall not answer the desired End; if the Patient is well stocked with Strength and Courage; if the Situation of the Nerves and Arteries is favourable; you may cut out all the *callous* Parts with your Knife, or destroy them with the actual Cautery. This Operation, though attended with great Pain, will bring the most obstinate *callous* Ulcer to the State of a recent Wound; and unless a Caries, bad Habit of Body, Pox, Scurvy, Dropsy, or some other constitutional Complaint is in the Way, it may be cured by the most common Remedies. Therefore there is no Reason why we should fall into Admiration at, or doubt the Veracity of, M. A. SEVERINUS, when he affirms, that he has happily succeeded in the Cure of the most desperate Ulcers, by this Method.

CHAP. VI.

Of ULCERS supposed to be produced by MAGIC or WITCHCRAFT.

Medicine
foreign to
this Case.

I. **T**HE Remedies that PARACELSUS, HELMONT, AGRICOLA, and many others have, with great Industry, invented to cure Ulcers, which are the Effect of Magic, and always contain something unnatural in them, as Thread, Nails, Needles, are entirely useless, and therefore ridiculous and absurd. But if any are to be preferred to the rest, we should give the first Place to the following Remedies: *Folia Querneæ, aut Saligneæ, Adiantum, Hypericum, vel Fuga Dæmonum, Mercurius vivus, Asa Fætida*. These are hung round the Neck, or applied in some idle Manner, so that they can do no Mischief. Some prescribe the Ashes of a Witch that has been burnt: Others burn *Stercus Humanum*, and sprinkle the Ulcer with the Ashes. HEERIUS and HORSTIUS are high in the Commendations of *Unguentum de Visco Corylino* CARICHTERI: MYNSICHT prescribes his *Emplastrum Fætidum*. Others, different Remedies of equal Efficacy.

I

II. These

II. Those Physicians who consult their own Reputation, and the Health of their miserable Patients, shall, I say, or infatuated Patients, will prescribe natural Remedies, such as are best suited to the Nature of the Ulcer, and the Patient's Habit of Body, as we have taught in the foregoing Chapters. For although we should make ever so large Concessions, concerning the Power which Devils and Sorcerers are by some supposed to have over Men, yet we should never be justified in asserting, that Disorders thus produced, were not to be treated by natural Remedies, but that we ought to have Recourse to superstitious, nasty, and ridiculous Methods of Cure. To say the Truth, those Ulcers are usually affirmed to be the Effect of Magic by unskilful and superstitious Barbers and Medicasters, which evade their Art, though at the same time they are easily to be cured by an experienced Surgeon, who can thoroughly investigate the true Cause and Nature of the Disorder. There have been, even amongst the Surgeons, ill minded Men, who have falsely affirmed Ulcers to be the Effect of Magic, in order to enhance the Price of the Cure.

What is to be done.

C H A P. VII.

The Method of treating old ULCERS, especially those that affect the LEGS.

I. **A**LTHOUGH there is scarce any Part of the Body free from inveterate and obstinate Ulcers; yet the Legs are found to be much more subject to them than the rest. As we before (*Chap. III.*) treated of malignant and inveterate Ulcers in general, we shall here only consider those which are seated in the Legs, or lower Extremities. But the general Causes of obstinate Ulcers in the Legs, are almost always the same with those of malignant Ulcers in general. For these, like the former, usually arise either from a bad Habit of Body, too great Thinness or Acrimony in the Juices; or from being attended with Callosity, and Caries of a Bone; or, lastly, from the Obstruction of some usual Evacuation, as of the Menstrues in Women, or from other Causes of the like Nature. In order therefore to remedy these Ulcers, the Surgeon should give a particular Attention to their Causes, that he may be thereby led to a rational Treatment of them.

In what the Cure chiefly consists.

II. Before we enter into an Inquiry, what are the most likely Means to be used to cure these Ulcers, it will not be amiss to examine, whether they can be healed without Danger to the Patient. For we are furnished with frequent Examples, in the Writings of Physicians of the greatest Experience, where the worst of Disorders, and even Death itself, has been the Consequence of healing these Ulcers. The Answer to this Question, if I am not mistaken, is very clear, from what I have delivered above, in *Chap. I. No IX.* to wit, in Persons advanced in Years, or labouring under an infirm Habit of Body, it is most advisable not to attempt to heal them: Since they are in this Case to be looked upon rather as a Relief of Nature, than a Disorder, as they serve to drain off all noxious Humours from the Body. But I would not have this Rule extended to young robust Subjects, without some very material Reason. For in these, the first Cause of stubborn Ulcers may be removed, by Abstinence or a regular Way

Whether Ulcers in the Legs may safely be healed.

of Living, by opening Fontanells, or by proper internal Remedies, without any Danger: And the Cause being removed, the Ulcer may be healed with great Safety.

What is to
be observed
in general,
in old Ul-
cers.

III. Although we have declared above, that it is improper to heal inveterate Ulcers in old Subjects; yet I am very far from affirming, that no Care at all should be taken of them. On the contrary, I think it absolutely necessary that they should be attended to. The Surgeon is to observe two things in this Case: First, to relieve the Pain, and other violent Symptoms; next, to prevent the Ulcer from spreading, and new Symptoms from coming on.

Internal Re-
medies.

IV. In the first Place, Abstinence and a strict Regimen in Diet is to be observed. They should abstain from Pork, from all salt or seasoned Meats, or of hard Digestion, and eat but sparingly of the most innocent Food, Gentle Purges are to be frequently repeated, to carry off the redundant Humours by Stools. Proper internal Medicines are also to be prescribed, such as are most likely to remove the Cause of the Ulcer. In Persons advanced in Years, balsamic and bitter Medicines are requisite, to temper the violent Acrimony of the Blood: As *Elixir Proprietatis*, *Essent. Myrrh. Essent. Saccini*, *Essent. Balsami Peruviani*, and others.

External Re-
medies.

V. With regard to the external Treatment of the Ulcer, Care must be taken that it be cleansed from its Sanies, once or twice every Day. You may then dress it, either with dry Lint, or with Lint dipt in *Decoct. Fol. nucis Juglandis vel Aristolochiae*. Over this you may lay the *Emplastrum ad Ulcera antiqua* BAUHINI, *Diasulphuris* RULANDI, *Diapompholygos*, *Saturninum*, *de Lapide Calaminari*, or any other of this Kind. These Rules being nicely complied with, if the Patient is well guarded from external Cold, and particularly from a moist or damp Air, there is no room to doubt but these Ulcers may become very mild, and convenient for the lengthening his Life. The Physicians amongst the Antients, observing the salutary Effects of Ulcers upon old Persons, thought Nature to be the best Guide, and therefore opened Fontanells in many Cases, which answer the End of Ulcers, in draining off the noxious and redundant Humours.

How In-
flammation
and Pain is
to be treated.

VI. Whenever Inflammations and violent Pains come on, as they frequently do, either from a Blow, or Cold, or putting the Leg into cold Water; or from Passions of the Mind, or Irregularity in Diet; it will be proper in this Case, first, to take away some Blood, in plethoric Constitutions: Then to apply a Linen Compress, dipt in *Aqua Reginae Hungariae vel Spiritu Vini Theriacali, aut Camphorato, vel & Aqua Calcis & Spiritu Vini Camphorato calidis*. The Patient should keep his Bed, and defend the injured Limb as much as possible from Cold: And in the Morning he should be ordered to drink plentifully of small Green Tea, White Wine Whey, or any other small Liquors that may be likely to promote a Sweat. By these Means the Inflammation and Pain will quickly go off. But there is great Danger, when the Patient is of a bad Habit of Body, if the Inflammation runs to a great Height, and begins to degenerate into a Gangrene. In this Case the same Remedies are to be used, both internal and external, which we prescribed above when we were treating of a Gangrene (*Book VI. Chap. XIV. No V. and the following.*) But above all, you are here to be very careful to keep up the Spirits of weak and aged Persons with proper Remedies, (particularly the Bark) and to provoke gentle breathing Sweats. If these

Rules

Rules are neglected, there is very imminent Danger that *Sphacelus* and Death will by Degrees steal upon you.

VII. When these Ulcers dry up spontaneously, in old and infirm Persons, a How to treat Ulcers that dry up spontaneously. Horror, Nausea, and a great Weakness usually succeed, which declare Death to be at hand. (*Chap. I. N° IX.*) The first Intention is, to support the remaining Strength of Nature as much as possible by proper Diet and Medicines. There should instantly be applied to the Ulcer *Radix Gentianæ, vel Iridis Florentinæ contrita*; or if these shall be thought of too little Force, *Radix Hellebori nigri in Pulverem aut Globulos redacta*; or, lastly, *Pulvis Cantharidum, aut Globulus ex Emplastro Veficatorio Officinarum*. These Applications will produce so great a Stimulus, that the Ulcer will frequently run again, to the great Relief of the Patient: When this happens, you must treat it as before. But when it resists all Remedy, and still continues dry, you have no Hopes of Life remaining.

C H A P. VIII.

Of C A R I E S of the BONES.

I. **T**HE *Caries* or Corruption of the Bone may very justly be esteemed one of the principal Causes of the Depravity and Inveteracy of Ulcers. For you will find it scarce practicable to heal an Ulcer, or if you do bring it to heal, it will not remain long in that State, where you have a carious Bone concealed at the Bottom.

II. We call that Disorder of the Bone a *Caries*, where the Bone, from what-A Caries, what.soever Cause it shall proceed, is deprived of its Covering, or *Periosteum*, and having lost its natural Heat and Colour, becomes fatty, yellow, brown, and at length, black. This is the first and lightest Degree of this Disorder, and is called by the Antients, according to CELSUS, *Lib. VIII. Cap. II. Os Vitiatum* and *Nigrities*. But the greater Degree of this Disorder is, when the Bone is eroded and eaten, and becomes uneven like a Pumice Stone, from the Number of small Holes, of which it is full; when it discharges a filthy Sanies, whose Acrimony softens, relaxes, and destroys the fleshy Parts that grow round it. This is a true *Caries*, or *Ulcer of the Bone*, and every Bone in the Body is subject to this Disorder. And although this Ulcer may sometimes appear to be very happily healed, yet, after the Cicatrix has been brought on for some time, you have an Abscess formed: The Disorder will return afresh, and the acrimonious corrupted Matter, which continually spues out from the carious Bone, being collected within, will produce various grievous Symptoms, such as Shivering, Vomiting, and Fever, and destroy the neighbouring Flesh again.

III. There are many Names and Species reckoned of this Disorder, and of others that bear a near Relation to it. For it is called a *Caries*, ^a *Spina Ventosa* or *Spina Ventositas*, a Gangrene and Cancer of the Bone by ^b CELSUS, sometimes by the Greek Term ^c *Teredo*, and sometimes *Pædarthrocaces* ^d. Though some Au-

^a We have a Treatise on the *Spina Ventosa*, by PANDOLPHINUS, an Italian, republished with the learned Notes of MERCKLINUS, Norimberg, 1674, 12mo.

^b See the Book last cited, p. 258.

^c Ibid. p. 64, 104, 143, 264. and the following.

^d M. A. SEVERINUS treats on this Subject in his Book *De Abscessibus*, and there are several *Academical Theses* on this Head, by different Authors.

thors constitute as many distinct Species of a *Caries* as we have reckoned up Names, yet I think there is not so material a Difference between them, that we should multiply them into so many separate Species. Therefore I think it best to distinguish them into two Sorts: The first where the Disorder begins in the internal Part of the Bone; the other, on the Outside, or from an external Cause. I would call this a *Caries*, and that a *Spina Ventosa*: Or when it happens in Children, I would comply with SEVERINUS, and call it *Pædarthrocaces*. But of these we shall presently treat more fully, in a particular Chapter for that Purpose, and explain their Differences more accurately.

Causes.

IV. We find two Causes of the^a *Caries* of the Bone. For, 1. A *Caries* arises, when the Bone is deprived of its *Periosteum*, by a Wound, Fracture, Bruise, or any other Accident, and either is exposed to the Injuries of the external Air, or is corrupted by greasy Dressings, or the common vulnerary Oils which are usually applied to simple Wounds, such as *Oleum Hyperici*, *Lilior. albor. Balsamum Samaritanum*, &c. Or, 2. A *Caries* arises, when the Fluids are interrupted in their Circulation, by any external Violence, or internal Cause whatsoever, from whence Inflammation and Suppuration succeed; by which the *Periosteum* and Bone suffer to such a Degree, that the Vessels which are sent to these Parts for the Nourishment and Support of the Bone and *Periosteum*, being inflamed and corrupted, the Bone is brought into consent, and soon becomes carious. This Disorder, if not quickly remedied, spreads and communicates itself to the neighbouring Parts of the Bone, making the same Progress with Ulcers in the soft Parts.

Degrees.

V. From whence it evidently appears, that there are several Degrees of Erosion or *Caries* of the Bone. The first and mildest Degree is, when the Bone is laid bare, looks greasy, and turns yellowish. But as soon as it becomes truly yellow, brown, or black, the incipient *Caries* degenerates into a worse State. The third Degree is, when the Bone becomes uneven, rough, and rotten. The greater Erosion the Bones have suffered, the more rough and uneven will they appear. When the *Cranium* is perforated through both Tables, or the *Tibia* or *Femur* are broken through to the *Medulla*, this is a *Caries* of a very bad Kind. But the worst Kind of *Caries*, where indeed the Case may almost be pronounced desperate, is, that which falls upon the Joints, or any Parts of the Bones that lie deep: Because you can have no Access to it with your Hands, to clean the Bone, and the Case admits of no Remedy but Amputation of the Limb.

Diagnosis.

VI. A *Caries* may be discovered two Ways; as it is concealed, or as the diseased Bones are exposed to View. 1. When the Bones lie open to the Sight, the *Caries* discovers itself by the following Signs: The Bone looks greasy, and degenerates from its natural Colour, to yellow, brown, or black; it is bare, and the *Periosteum* destroyed. If you apply your Finger or Probe to the Bone, it will discover itself to be rough, uneven, and spongy. 2. But where the Bone is covered with Flesh, it will then discover itself by the following Signs: The Matter that flows from it will appear greasy, brown, or blackish, and stink like rank Lard. When you take off the Dressings, they will be tinged with a blackish Hue, from the Colour of the Discharge: When you have room to pass your Probe to the Bone (which is not always the Case) you will find it to be rough

^a HAYNE, in his Book *De Ossium Morbis*, treats ingeniously on the Formation and Causes of a *Caries*.

and

and uneven. The neighbouring Flesh will appear flaccid, soft, loose, spongy, and stink like rank Lard. Lastly, in Cases where you can neither see the Bone, nor get at it with your Probe, you may very reasonably suspect it a foul Bone, when the Ulcer frequently breaks out afresh, after it has been healed, without any other manifest Cause; and especially if any Fragments of Bone are discharged from it.

VII. From what has been laid down, it plainly appears, what Dangers the *Caries* is attended with, and what Event we may expect from each different Degree of it. ^{Prognosis} Ulcers of this Kind give great Trouble in healing: They are very apt to spread, especially where we cannot conveniently come at the *Caries* to destroy it: And when they are healed, they frequently break out again, as was just observed. Where the Disorder increases, and extends itself to the Joints, particularly to the Knee, there is scarce any Remedy, but Amputation of the Limb. Where the Circumstances are such, that it shall not be thought advisable to take off the Limb, the Patient is followed with great Weakness and a feverish Disorder, and by Degrees, with Death. *Caries* in the *Femur*, *Coccyx*, *Os Sacrum*, *Carpus*, *Tarsus*, and *Ossa Palati*, meet with extreme Difficulty in the Cure. When the *Cranium* is affected with this Disorder, it is frequently eat through even to the *Dura Mater*: From whence proceed acute Pains of the Head, great Watchfulness, Vertigo, a disturbed Imagination, and many other Disorders of that Kind, with great Danger of Death.

VIII. With regard to the Cure of a *Caries*, many Methods have been attempted. ^{Cure 1. By Medicine.} The first and mildest Method is applied to the slightest Degree of a *Caries*, and is performed by the Application of Spirituous Remedies; such as *Spiritus Vini*, or *Aqua Reginae Hungariae*: With which Applications alone I have cured slight *Caries*. Or by Balsamics, such as *Pulv. Aristolochiae*, atque *Iridis Florentinae*, vel *Pulv. Myrrhae atque Aloës*. One of these Powders is to be sprinkled upon the Part, after you have diligently wiped away the Sanies with dry Lint: This Method is to be continued till the diseased Part of the Bone is cast off, and new sound Flesh springs up in its stead. In a *Caries* that penetrates somewhat deeper, stronger Remedies take place: Such as ^b *Pulv. Euphorbii*, vel *Essentia Euphorbii*, cum *Spiritu Vini optimo parato*, vel *Oleum Coryophyllorum Cinnamomi aut Ligni Guaiaci*. These may be applied with a Pencil, or spread upon Lint, and laid on the Part affected. Others apply corrosive Medicines, as the *Aqua Phagedanica*, aut *Spiritus Vitrioli aut Sulphuris*, and with the same Success. In the room of all these, you may very well substitute, *Solutio Mercurii in Aqua Forti vel Spiritu Nitri*. We have enumerated these as the Principal, from a great many other Remedies of the like Nature, that have been prescribed for the same End. We purposely pass by such as are either too weak for the Intention, or too vehement to be admitted with Safety: Such as *Arsenicum vel Mercurius Sublimatus* in Substance. When you have procured an Exfoliation of the diseased Part of the Bone, your Business is, to complete the Cure with Balsamics: Therefore the next Dressings to take place, are, *Aqua Reginae Hungar. Essentia Mastich. Myrrhae, Succini, Aloës, Aristolochiae, Balsamum Peruvianum vel Capivi*, or any Balsam of this Kind: Cover these with a Plaster, and proceed after-

^a The Antients used the Cautey or Rasp in the slightest Cases, as you may see in *CELSUS, Lib. VIII. Cap. II.* but at present we never use these violent Methods, but in desperate Cases.

^b This is highly extolled by many. See *MERCKLINI Lib. De Spina ventositate*, p. 473.

wards as you are directed above in the Cure of Ulcers in general (*Chap. I. N° II. and the following.*) Le DRAN has given us Observations on *Caries* of the Bones very well worth our remarking: Particularly on a *Caries* of the Cubit, *Obs.* 51, 52, 53. in the Loins, *Obs.* 69. after the Small Pox, *Obs.* 70. in the *Os Ilium*, *Obs.* 95. in the *Trochanter major*, *Obs.* 97. in the Knee, *Obs.* 102, 103. and in the *Tibia*, *Obs.* 104.

2. by the
Trepan.

IX. A Second Method of Cure for a greater Degree of *Caries*, consists in^a perforating the Bone after it is laid bare, with the Trepan or Instrument described in *Plate VII. Fig. 2. or Fig. 7. A. or Plate XV. Fig. 8.* in the same Manner, as we advised in another Place to be done with the *Cranium*, after it had been laid bare by a Wound. *Book I. Chap. XIV. N° 17.* After this is done, the Part is to be dressed either with dry Lint, or with the Balsamic Medicines which we have recommended above. By these Means the Exfoliation of the foul Bone is forwarded, and new Vessels push through the Foramina that you have made, which joining with the neighbouring Flesh, make a new Covering for the Bone.

3. By the
Raspatory
or Chissel.

X. The third Method of Cure is performed by scraping away the discoloured or vitiated Part of the Bone, with a *Raspatory* or Chissel (*Plate VII. Fig. 3, 4, 5.*) till all the corrupted Parts being destroyed, the Bone appears white or ruddy and sound. CELSUS advises this Operation of rasping the Bone, to be done boldly and expeditiously. SCULTETUS is of Opinion^b, that you should never begin to scrape, till the Bone lies fairly exposed, or rather not till it begins to separate from the sound Parts; and that you should dress the Part with nothing but dry Lint, till this happens: But this Rule is not constantly to be observed. Others in particular Cases use a Chissel and Mallet, (*Plate VII. Fig. 10, 11.*) by the Assistance of which, they strike off the corrupted Parts from the sound. But both these Methods, N° IX, and X. have been pretty much neglected by the modern Surgeons. Though PETIT affirms, in his *Book de Morbis Ossium*, when he is treating of a *Caries*, that where you have fungous Flesh continually sprouting up, the best Method is, to rasp the Bone, and afterwards to use the Cautery. In certain Tumors of the Bone, which are called by us *Spina ventosa*, which refuse to yield to any medical Application, he advises not only to make frequent Perforations, but to take off the Tumors with the Chissel and Mallet. But we shall treat of this Case in the following Chapter.

4. By the
Cautery.

XI. The fourth, which is the most antient, ready, and certain Method of Cure, especially in the greater Degrees of this Disorder, is performed by burning down the vitiated Part of the Bone with the actual Cautery. See different Sizes and Figures of Cauteries in *Plate III.* Great Care must be taken in performing this Operation, that you do not injure the Flesh or other soft Parts that lie near. To prevent Mischief of this Kind, your Assistant should keep back the Lips of the Ulcer with his Hands: If the Opening is too narrow, it should be enlarged with a sponge Tent, or widened by the Knife, till the Bone lies fair. The Bone itself should be well cleansed with dry Lint: And if there is any fungous Flew, it should be removed before you go to work with your Cautery. One Application of the Cautery will seldom be sufficient for your Purpose, where the *Caries* is considerable: It must be frequently repeated, at longer or shorter Intervals as you shall think proper. If the *Caries* has spread itself

^a See the Method of perforating, by CELSUS, *Lib. VIII. Cap. ii.* and *iii.*

^b In *Armament. Chirurg.* pag. 42.

so wide, that you cannot destroy it with one Cautery, the first Iron should be applied to the Middle of it, proceeding afterwards to its Lips. This Operation is not attended with great Pain, if you take Care not to hurt the soft Parts: For the Bones have no Sense of Pain. * When the Bones of the *Cranium* are become carious, a cautious Surgeon will never risque his Reputation on this Operation, from the apparent Danger there is of injuring the Membranes of the Brain, or the Brain itself. The same Caution may be observed in some other soft and spongy Bones, as in the *Sternum*, or a carious *Rib*, where for the like Reasons the Cautery is to be avoided. The *Carpus* and *Tarsus* will not well admit of cauterising, and other spongy Bones of this Kind: And that more particularly from the Neighbourhood of the Tendons and Ligaments, which will necessarily be in great Danger of suffering.

XII. When you have cauterised the Parts in the Manner I have described, you should dress at first with dry Lint: But if the Patient complains of a Sense of Heat in the Part, you should moisten your Lint *cum Spiritu Vini*. You may afterwards dress with Balsamics, such as we described above at N. VIII. till the Exfoliation succeeds: And the Vacuity will shortly be filled up with new sound Flesh, which will be a Testimony of the Recovery of the Part. But where it happens otherwise, and the Bone is left bare, uncovered with Flesh; or if the Flesh with which it is covered, is soft and spongy, and does not adhere sufficiently to the subjacent Bone; or where the Bone remains discoloured; in either of these Cases, your original Disorder is not extirpated. In these Circumstances your Work is to be done over again, the spongy Flesh must be removed, either with the Knife or Cathæretics, such as the *Alumen ustum et Mercurius præcipitatus ruber*, or stronger, if they shall be found necessary: And the actual Cautery must be again called for, or you cannot expect your Cure to stand.

XIII. When the Caries penetrates even to the *Medulla* in the larger Bones, When a Caries penetrates to the *Medulla*, the Trepan is sometimes necessary. ^b PETIT advises us, after the Example of ^c MEEKREMIUS, to make a Perforation, or two, or more, in the Bone with the Trepan; and furnishes us with an Instance where he made three Perforations in this Manner, in the *Tibia*, after he had tried the Cautery, and was justified by Success. But this Method can scarcely be put in Practice upon any other great Bone than the *Tibia*, because you will be obstructed by the great Quantities of muscular Flesh which you will meet with. He further informs us, that the *Os Pectoris* or *Sternum* may be perforated in this Manner, to make a Passage for the Discharge of Matter, which is sometimes confined under it; and to make Way also for the immediate Application of Medicines to the disordered Parts. But the Performance of this Operation on the *Sternum* requires the greatest Caution and Deliberation: Because Respiration may be injured by it, or other grievous Disorders may be produced. It is to be observed in this Place, that the Caries of the Bone which penetrates to the *Medulla*, or begins in the *Medulla* (which we term the *Spina Ventosa*) does not always arise from an internal Cause, but frequently from an external Violence; by which the Vessels which are distributed on the internal Part of the Bone are burst, and Blood extravasated. This by its Stagnation in the Cavity quickly forms Pus, erodes the Bones, and produces a Caries, which extends itself from the *Medulla* to the external Parts.

* CELSUS has given the same Caution, *Lib. VIII. Cap. ii. de Carie.*

^c *Obs. Med. Chirurg. 72. edit. Latina, & 69 Belgica.*

^b *Lib. de Morb. Ossium, cap.*

XIV. When

Admonitions of
CELSUS.

XIV. When the Blackness or Caries extends to the other Side of the Bone, so that the whole Bone seems to be corrupted, CELSUS advises to take it entirely out, *Lib. VIII. Cap. 2. 3.* If the lower Part remains sound, you must remove only as much as is corrupted. If a Bone of the *Cranium*, or the *Os Peloris*, or one of the *Costæ* is carious, the Cautery is not to be used, but it must be cut out. And in this no Delay is to be suffered, but you are to take it out the Instant you have laid it bare, before any inflammatory Symptoms come on, by which means you will do it with greater Safety. When a Cartilage is become carious, you must pare off the carious Parts with your Knife, according to CELSUS; to whom I am obliged for this Section, not having met with any modern Surgeon, who has treated so well on this Subject.

In what the
Cure of a
Caries consists.

XV. Upon a diligent Attention to what has been delivered, we may very reasonably conclude, that the principal Business in curing a Caries of the Bone, consists in a speedy Extirpation of the carious Parts of the Bone. This is done in very slight Cases by the Application of *Spiritus Vini*, or *Aqua Regiæ Hungariæ*; in Cases of more Consequence, by a Solution of *Argentum Vivum in Aqua Forti*: But in Cases of the last Consequence, by the Cautery or Knife. The rest of the Cure is performed in the same Manner as other Ulcers are treated, by the balsamic Remedies which we have so often recommended.

How Bones
that are very
rotten are
to be treated.

XVI. Where the Bone is exceeding rotten, or where the Disorder has communicated itself to the Joint, for Instance to the Knee, or to any Joint of the Arm or Leg, so that the vitiated Part cannot be extirpated, and the rest of the Limb preserved; you have only one Remedy left, and that a melancholy one, which is the Amputation of the diseased Limb. Otherwise your Patient will drag on a miserable Life: Yet at last perhaps worn down with Pain and Weakness, attended with a long Train of grievous Symptoms, he must yield to Death^a. In the large Bones, where the whole Bone is not carious, but only Part of it, as the external Part of the *Maxilla*, *Os Humeri*, *Tibia*, or *Clavicle*; or any Part of the *Rib*, *Ulna*, *Radius*, or *Fibula*, &c. you must not immediately proceed to the Amputation of the Limb, but only remove, in the most convenient Manner you can, either by medicinal Applications, or by the actual Cautery, the diseased Part of the Bone, dressing afterwards as we taught above at *Seç. XII.* till the Bone is covered with sound Flesh, and the Ulcer healed. Sometimes Part of the vitiated Bone separates spontaneously from the rest of the Bone. If you can lay hold of it, and the Ulcer is wide enough, you should remove it with your Fingers or the Forceps: If the Ulcer is not wide enough to admit of this, you must enlarge it with your Knife. You will meet with a remarkable Case of this Kind in MEEKREM. *Observ. Chirurgic.* 66. *Edition, Belgic. et Observ.* 69. *edit. Latine*, where a large Portion of foul Bone separated and cast off from the Arm: And another in RUYSCH. *Observat.* p. 94. *ac The-saur. Anatomic*, VIII. *Tab. III.* where the same Case happened in the *Tibia*.

^a LE DRAN gives us several Instances of an Amputation in a *Caries*; particularly *Obs.* 101, 102, 103, 104. But many of these Patients died, for the Reasons just mentioned.

CHAP. XI.

Of the SPINA VENTOSA, PÆDARTHROCAES, and EXOSTOSIS, which may be called TUMORS OF THE BONES.

I. **T**HAT Species of Corruption of the Bones, which takes its Rise in their internal Parts, and by Degrees enlarges the Bone, and raises it into a Tumor, is at this Time called, by Physicians and Surgeons, a *Spina Ventosa*, by some ^a *Spinæ Ventositas*: Though the Antients were entire Strangers to these Terms, and distinguished them by the Names of *Sideratio*, *Gangræna*, or *Cancer Ossis*, or sometimes by the Word *Teredo*. Some amongst the French call it an *Exostosis*^b. Though this Term more properly belongs to certain ^c Eminencies or preternatural acuminated Excrescences in the Bones, which happen after a Fracture or other Accident, and are sometimes accompanied with a *Caries*, yet I have frequently seen this Case of the Bones, and have now Bones of this Kind in my Collection, where there is not the least Appearance of *Caries*. This Disorder seems to have borrowed the Term *Spina* from the Resemblance which the Eminences of the Bone in this Case bear to Thorns, continually pricking the Flesh, and producing grievous Pains: And the Epithet *Ventosa* is added, because the Tumor appears upon touching to be filled with Wind or Air, though in Fact it is never, or ^d very seldom distended with Air. Afterwards several Writers, and particularly PANDOLPHINUS, barbarously distorted the Word into *Spinæ Ventositas*.

II. When this Disorder happens to Children, many, with M. A. SEVERINUS, call it ^e *Pædarthrocæces*, from the Greek Words *παις* a Child, *αρθρον*, a Joint, and *κακον* an Evil: To signify that this Disorder is most frequently found in the Joints of Children: For as the Bones of Children are softer and more spongy than the Bones of Adults and old Persons, they are therefore so much the easier distended by Humours, and more frequently form ^f Tumors. SEVERINUS made another Distinction between the *Spina Ventosa* and *Pædarthrocæces*. For some of these Tumors which we call *Spinæ Ventosæ*, are very painful, frequently look red, and have all the Appearances of Inflammation: Others are free from Pain (at least in any considerable Degree) in the Beginning, particularly in rickety Children, and these he called *Pædarthrocæces*. But at present these Names are pretty much confounded, and are deservedly, as ^g MERCKLINUS has taught us, used for one and the same Disorder; only with this Difference, that this Disorder in Children begins with little or no Pain, but is almost always attended with Pain in its Progress.

^a By the Arabians, witness Jos. PANDOLPHINUS, *Lib. de Ventositate Spinæ*.

^b See MERCKLINUS, Annotations on PANDOLPHINUS, and what we said above at *Sec. III.*

^c See GORÆUS in *Definit.* Jo. A. VIGO in *Chirurg.* and PETIT *Lib. de Morb. Ossium, cap. de Exostosi & Carie*.

^d MERCKLINUS relates a Case of this Kind, where, upon opening a Tumor, nothing was discharged but a Flatus, and the Patient died.

^e See M. A. SEVERINUS's Book *de Pædarthrocæce*, contained in his excellent Work *De reconditâ abscessuum naturâ*; also the academical Theses of AMMANNUS, TANSIUS, MÆBIUS, CHUNIUS, and others.

^f Cases of this Sort may be seen in M. A. SEVERINUS *de Abscess.* p. 144. and p. 467. RUYSH. *Epistol. Anatomic.* XIV. BIDLOO *Exercitat. Exostosi.*

^g et seq.

Symptoms.

III. There are other Names of a *Caries*, which we have recited above *Sett. I.* and in the foregoing Chapter *Sett. III.* which agree much better with this Disease of the *Spina Ventosa*, than with that Disorder, which is vulgarly and strictly speaking called a *Caries*; as *Cancer Ossis*, *Gangræna*, *Sphacelus Ossis*, which Terms are frequently used by the Translators of HIPPOCRATES; and the Greek Word ^a Τερενδων, which they translate *Teredo*, from the Similitude of those Worms which are called *Teredines*, which eat into and destroy Wood. It is very probable, that these are all synonymous Words for the *Spina Ventosa*, different perhaps only in Degree: But I shall spend no Time in Defence of this Opinion, because MERCKLINUS, in my Judgment, has sufficiently demonstrated not only this, but that the Disease itself was well known by the ^b Antients, contrary to the ^c Opinion of some. Whoever desires farther Satisfaction upon this Head, may turn to this Writer's Notes on PANDOLPHINUS's Book, which we have so often quoted. Lastly, we must observe in this Place, that PETIT, in his Book *De Ossium Morbis*, Chap. XVI. ranks all these Names and Diseases under the Name of *Exostosis*, and at the same time entirely neglects to mention the other Names, which are more vulgarly known, and in constant Use amongst medical Writers. Whether he has judged well in this Case, I leave others to determine. For my own Part, I shall chiefly use the Term *Spina Ventosa*, as the most received Name amongst us at this Time.

Differences.

IV. But these Disorders, particularly their *Differences* and *Degrees*, are, in my Opinion, not described with sufficient Accuracy by most Writers. I intend to describe them as clearly as I can; for great Numbers of these Cases have fallen under my Care: And nothing can tend more to an Improvement in the Method of treating these Disorders, than an accurate Knowledge of their Differences. A *Spina Ventosa* is by us understood to be a Corruption and Erosion, or *Caries* of the Bone, occasioned by a Depravity of the contained Fluids, and arising generally spontaneously, without any external Cause, beginning, not upon the external Face of the Bone, but between its *Lamellæ* or *Cells*, or in its internal Cavity: and extending itself, by Degrees, to the external Parts, at length affects either ^d whole Bone, or a ^e greater or smaller Part of it, expanding it to a greater Width, or raising it into a Tumor. (See Plate XII. Fig. 16. A. B.) It is frequently hard, and sometimes without Pain; at other Times it appears as if it was filled with Wind, and is attended with a greater or less Degree of Pain, pricking, shooting, at last it grows red, and is attended with other bad Symptoms; till the disordered Bone being, by Degrees, corroded, the common Integuments, and other soft Parts that lay over it, remaining at first entire, but at last partaking of the Disorder, foul Ulcers of the most stubborn Sort break out. When Tumors of the Bone are hard, and the soft Parts not inflated, and are free from Redness, Inflammation, and Pain, as is frequently the Case in rickety Subjects, in this Case they are not attended with such bad Symptoms as we have described above. SEVERINUS has given the Name of *Padarthrocaces* to these Tumors, as we have already observed, because this Case chiefly happens to

^a See GORÆI, *definitiones sub hoc vocabulo Τερενδων*

^b Pag. 52, 63, 257, et seq.

^c HEYNE was of this Opinion, *Lib. citat.* p. 62. He affirms, that this Disease was not known till the Appearance of the *Lues Gallica*.

^d This happens to the small Bones, such as the Bones of the Fingers, *Carpus*, or *Tarsus*.

^e This to the larger Bones, such as the *Ossa Cranii*, *Tibia*, *Femoris*, aut *Brachii*.

Children,

Children, and in order also to distinguish it from the *Spina Ventosa* of the *Arabians*. But the painful, red, inflated Tumors that happen equally to Children and Adults, are called *Spina Ventosa* *. *Cancer vel Gangræna Ossis, aut Terebines*. By an *Exostosis* I mean a preternatural Eminence of the Bone, which is somewhat acute, or if you please, an Excrescence of the Bone, whether it is attended with Erosion or not. A *Spina Ventosa* differs from a *Caries*, by being accompanied with Tumor; and is to be distinguished from the *Rickets*, because rickety Subjects are attended with various deformed Tumors on the *Epiphyses* of the Bones, without Pain or Erosion.

V. Each of these Disorders generally begin about the Heads or *Epiphyses* of ^{The Part affected.} the larger Bones, where they are most tender and spongy, and where the noxious Matter may not only have sufficient room to lodge in the cellular Substance, but where it will also meet with the least Resistance in softening and expanding the Parts ^b. Nevertheless, I have sometimes seen this Disorder arise in the Middle of these Bones, between their *Lamellæ*, especially in the *Tibia*. *Tophi*, and *Venereal Gummata*, as they are called, which arise in the *Os Frontis*, and on other Parts of the *Cranium*, and frequently on other Bones, particularly on the *Tibia*, may all be ranked under this Class, as they owe their Origin to an internal Cause, and are only distinguished from the others by being particularly painful in the Night. Yet we sometimes see this Kind of Tumor in very chaste Persons, and where there is nothing venereal in the Case. Thus you see the *Spina Ventosa* is not confined to the Bones of the Extremities, but seizes even upon the Bones of the Head, Face, Neck, and Breast: Though the Bones of the Arms, Legs, Fingers, *Carpus* and *Metacarpus*, *Tarsus* and *Metatarsus*, are more frequently the Subjects of this Disorder. You may see various Cases of this Kind in MERCKLINUS's Notes on PANDOLPHINUS, p. 227, et seq.

VI. They arise generally, as we have declared above, from internal Causes, ^{Generally from internal Causes.} from acrimonious, scorbutical, rickety, or variolous Humours ^c. But principally from a venereal Taint; for they were not so frequently ^d observed in *Europe* before the Appearance of the venereal Disease. In the mean time it is reasonable to suppose, nor is it contradicted by Observations, that this Disorder may sometimes owe its Rise to ^e external Causes, especially in Persons constitutionally disposed to these Disorders: When, for Instance, the Vessels between the *Lamellæ* of the Bone, or in the *Medulla* itself, are, by a Blow, Fall, or any other external Violence, injured or torn, and the Fluids extravasated. By Degrees they putrify, corrupt and destroy the *Medulla*, and soften and corrode the Substance of the Bone: Whence proceed Pains, Tumors, Ulcers, and *Fistula* of Bones and the adjacent Parts, and all the same Mischief which is usual to arise from internal Causes.

* Vid. CELSUS L. viii. C. 10. TULPIUS *Obs. Med.* L. iv. C. 12.

^b I have dissected several, who died of this Disorder; and in some I found the Bones softer than a Cartilage.

^c HILDANUS gives you Instances of this Kind, *Cent.* 4. *Obs.* 95, 96.

^d Some are of Opinion, that this Disorder was absolutely unknown till the Appearance of the Venereal Disease; as HEYNE, in *Lib. de Morb. Oss.* p. 62. but MERCKLINUS, in his Notes on PANDOLPHINUS, *Cap.* I. has plainly evinced the contrary, and shewn that it was known to HIPPOCRATES, GALEN, CELSUS, and others, who have described it under the Names of *Sideratio*, *Gangræna*, *Cancer Ossis*, &c. which are only different Names for the same Thing.

^e See an Instance of this in HEYNE, *De Morb. Oss.* N. 29.

Proximate
Causes.

VII. The Proximate Cause of this Disorder is either a Collection or Congestion of a viscid and thick, or of an acrimonious and corroding Humour; or an Inflammation arising in the *Medulla*, or in the Substance or Cells of the Bone, degenerating into an Abscess, and forming *Ichor* or *Pus*. As these stagnating Fluids can find no Discharge from the Bones, especially from their Cavities, they are confined there, till they putrify and become acrimonious, corrode and destroy the neighbouring Parts, converting them, particularly the *Medulla*, into a like Kind of Sanies; at length they attack the Bone, and destroy that. The Collection of viscid and pituitary Fluids, with the Expansion of the Bones, sometimes happens without Pain, as in the *Pædarthrocaces**: But the Erosion of the Parts can never happen without the most acute Pains, proceeding, as we say, from the inmost Marrow. But in the Beginning of this Disorder, when the Mischief is only in the internal Part of the Bone, the Pain does not increase upon external Pressure: When the Pain increases upon Pressure, the external Parts are brought into Consent. When this happens, the *Periosteum* and Parts that surround it, with the Substance of the Bone and the *Tunica cellularis* enlarge; from whence a Sensation frequently arises, as if the Parts were filled with Air or Wind, and the Disorder was hence called *Ventosa Spina*. But when the Tumor is opened, either spontaneously or by the Knife, if the Bone lays bare, you will frequently find it full of small Erosions, resembling a Sponge or Pumice Stone, as it is in a *Caries*. From what has been here delivered, you may learn the near Resemblance that these two Disorders bear to each other, their Signs, and at the same Time some material Differences by which they are to be distinguished.

Degrees of
a Spina
Ventosa.

VIII. A *Spina Ventosa*, strictly so called, may very properly be divided into three Degrees. The first is, when the Patient complains of a continual grievous Pain in the Bone, which seems to him to proceed from the *Medulla*, and torments him so that he can have no Sleep. At this Time there is no external Pain or Tumor. In this State the Disease is confined to the internal Part of the Bone. The second Degree of the Disease is, when after these Pains a red Swelling appears upon the Face of the Bone, either hard, or soft, and as it were windy, with external Pain more or less. The third Degree is, when after all the former Symptoms, an Abscess is formed in the Tumor, which either bursts spontaneously, or is opened with the Knife, and discharges a fetid *Ichor*, or purulent Matter, smelling like rank Butter or Lard; and afterwards maintains this Discharge in greater or smaller Quantities, like a carious Ulcer, and creates, what the Antients usually called an Ulcer with *Caries* of the Bone. This Species of the Disorder may be called an *Inveterate Spina Ventosa*: The other a recent or incipient one.

Pædarthro-
caces.

IX. A *Pædarthrocaces* begins with an Enlargement of the Bone, and generally without any Pain or external Cause: But in its Progress it is frequently attended with Pain and Inflammation, and at length with Abscess, Ulcers, *Caries*, as in the *Spina Ventosa*, especially about the Joints and Extremities of the Bones; and in short is attended with the same Symptoms with the *Caries* and *Spina Ventosa*. From whence it is evident, that the *Pædarthrocaces* may in some Measure

* MERCKLINUS thinks this cannot happen without Pain, but SEVERINUS and I have often seen it.

be looked upon as a distinct Disease, in the Beginning; but if it is not presently relieved, it will at length become a perfect *Spina Ventosa*, differing from the other in nothing but Degree.

X. From considering what has been already delivered, especially what has ^{Prognosis.} been taught in the preceding Chapter at *Sett.* VII. concerning the *Prognosis* of a *Caries*, it will be no difficult Matter to form a *Prognosis* of what we are to expect in the Course of Disorders of this Kind. For as it is manifest, that corrupted acrimonious Matter, when it is confined in the Cavity of a Bone, or included in its *Lamellæ* or Cells, cannot be easily discharged, either by Nature or Art; it necessarily follows, that it will, by Degrees, corrupt and destroy the Parts that lay near it; till at length the Bone itself, if a timely Remedy is not applied, will be entirely corrupted and destroyed, so as to make it necessary to take off the whole Limb in order to save the Life of the Patient. Nay, what is still worse, if this Disorder arises from a vitiated State of the Blood, when you have taken off one Limb which shall have been affected in this Manner, you shall have it return with equal Fury in another, in the same Manner as it happens in cancerous Cases: Though this is not constantly the Case, especially if you correct this State of the Blood by proper Remedies, and by enjoining a strict Regularity with regard to Diet. In the *Pædarthrocæces*, and frequently in the two first Stages of the *Spina Ventosa*, the Disorder is happily cured by the Administration of proper Remedies. But the Cure will be attended with greater or less Difficulty, in Proportion to the Inveteracy of the Disorder, the Progress it has already made, the Strength of the Patient, the Degree of Corruption in the Blood, the Number and Violence of other Symptoms that accompany it; nay, sometimes it will be plainly incurable, unless you proceed to Amputation; and the Strength of the Patient being exhausted, he dies tabid.

XI. There are two Methods of treating a *Spina Ventosa*. One is suited to the ^{Cure of the} two Degrees of the Disorder, which we described above, as the milder State: ^{Spina Ven-} The other to the most violent or third Degree, when the Bones, with the Parts ^{tosa.} surrounding them, are entirely corroded and destroyed. The best Method that ever I could find for treating the slighter Degrees of this Disorder, is the following. (1.) If the Patient is an Adult, endeavour to correct the Acrimony of his Blood, by prescribing him a Decoction of the Woods, *sc. ex Rad. Sarjaparillæ, Chinæ, Scorzonæ, Ligno Sassafras, Guaiaci, Juniperi*. Let him drink largely of this every Morning in Bed, as warm as you usually drink Tea or Coffee, giving him from eight Ounces to twelve Ounces at a Time, according to his Strength. In the first Draught let him take *Essent. Lignorum, vel Pimpinell. ad Grs. 50. vel 60.* or some other Drops of the same Intension, endeavouring to raise a gentle Sweat. These Medicines will penetrate into the finest Vessels, and even into the bony Fibres, and drive out the noxious Humours, or correct them, greatly promoting the Digestion and Dispersion of stagnating Fluids and Tumors. (2.) This Intension will be greatly forwarded by fumigating the affected Parts with the Steam from Decoctions of resolving or aromatic Herbs. (3.) In the intermediate Times let the Part be rubbed twice in a Day with *Unguentum Mercuriale*, covering it afterwards with the *Emplostrum Mercuriale*. (4.) At the same Time it will be proper to prescribe mercurial Remedies internally, to weak Persons but once, to robust Habits oftner, so as to raise a gentle Salivation: This must be put in Practice, or omitted, according to the Degree

Degree of the Disorder, and the Strength of the Patient. I am fully satisfied by Experience, that no Good is to be done in this Case without the Assistance of mercurial Remedies, which makes it very suspicious that this Disorder proceeds from a venereal Taint, or has something very near a-kin for its Cause. By diligently pursuing this Course for several Weeks (for it will not presently gain ground) the first and even second Stage of this Disease, where you have bony Tumors formed, may be cured, and the Tumors dispersed, or at least brought to that State, that they will not increase, but remain as they are, without bringing on any Pain, or other remarkable Inconveniency. This I have frequently seen, where I could by no Means disperse them: Especially where the Patient is regular and moderate in his Diet, living upon soft Broths instead of solid Meats, and drinking the small Runnings of the aforementioned Decoction for his common Drink; or, instead of that, the *Decoction Cornu Cervi*, *Hordei*, *Avena*, or any other thin aqueous Liquors.

Cure of the
Pædarthrocaces.

XII. The same Method must be used in treating the *Pædarthrocaces*, whether attended with Pain or not; giving frequently, at proper Intervals, gently opening Medicines with small Quantities of *Mercurius Dulcis*. If this Disorder is accompanied with the Rickets, you must administer Medicines adapted to this Complaint, and advise frequent Exercise.

Cure of a
bad Spina
Ventosa.

XIII. If either of these Disorders should be so far advanced, as to be out of the reach of the Remedies we have already advised; if the Pain and bony Tumors increase, Abscesses are forming, and you have great Reason to fear the entire Destruction of the Bone; if the Abscess does not burst of itself, you must not stay for its Maturation, but lay the Bone bare with your Knife in the most proper Place, which is generally the most painful, and descending Part, or where it is already burst. If the Opening is too narrow, you must enlarge it; if your Patient dreads the Knife, make your Opening with a Caustic, and afterwards make several ^a small *Foramina* in the Bone with the small Piercer, *Plate VII. Fig. 2. or Fig. 7. A. or Plate XIV. Fig. 8.* You must pierce down to the *Molla*, that there may be room for a Discharge of the confined Matter. But where these *Foramina* are not sufficient for the Discharge, you must apply a larger Piercer, which they call the Trepan ^b, if the Bone will admit of it with Safety; which will not only make greater room for the Discharge of the corrupted Matter, but you will also be able to apply your Medicines more conveniently to the Part. Whilst you are proceeding in this manner, you must insist upon the internal Use of the Essence and Decoction of the Woods, with antimonial and mild mercurial Medicines: Externally you must treat the Ulcer with cleansing and balsamic Applications, such as *Decoctum Agrimon. Saniculæ, Hyperici vel Aristolochiæ, cum Melle Rosar. & Essent. Myrrhæ ac Aloes*, which should be injected with a Syringe twice every Day; or a Solution of *Mercurius Dulcis in Aquâ Plantag. vel. Aquâ Calcis*. Afterwards you may dress with the Essences we have just mentioned, or *cum Essent. Mastichis aut Succini*, spread upon Lint, covering all with a mercurial Plaster, or with any other that you shall think more convenient. This Method is to be continued till the Parts

^a This has been advised by CELSUS, PAREUS, SEVERINUS, SENNERTUS, MARCHETTUS. See MERCKLINI *Nor.* p. 483, seq. ^b CELSUS has recommended this Method, *Lib. viii. Cap. 2 & 3*, and HEYNE, *Lib. de Off. Morb.* p. 68. and PETIT, *Lib. de Morb. Off. Cap. de Exosiosi*: And BOERHAAVE, in *Aphorism. practic.*

heal.

heal. Sometimes the actual Cautey may be used to Advantage in this Case, to root out the Disorder, especially when it is only between the ^a *Lamellæ* of the Bone. Rasping or Scraping seems to me to be much better suited to the *Caries* of the Bone, than to the *Spina Ventosa*.

XIV. But when Things are still worse, and all the Remedies we have hitherto recommended are of no Effect; when the Part is already too much corroded and destroyed, so that there are no Hopes left of saving it, or indeed of saving the Patient, but by amputating the diseased Part; you must determine on the Operation, which is to be considered in two Lights, according to the Difference of the Parts affected. 1. When the Disorder is situated on the small Bones, as on the *Carpus*, *Tarsus*, *Metacarpus*, or *Metatarsus*, or even on the Finger; it will not always be necessary to take off the whole Member, that is to say, the Finger, Foot, or Hand: But it will frequently suffice to remove the corrupted Bone alone. For Instance, when the last or middle Bone of one of the Fingers has been diseased, I have taken out the foul Bone, and left the sound Part of the Finger remaining. When the *Metatarsal* Bone, that supports the great Toe, has been diseased^b, I have removed the corrupted Parts from the sound, and saved the Toe. This I did in a Boy of ten Years of Age, and he recovered so well, that he walked afterwards as well as before^c. Where the whole Finger, or only the first Bone, has been foul, I have taken off whole Fingers and Thumbs.

Cure of the last Stage.

XV. In larger Bones, when the whole Bone is not affected, but only a Portion of its external Surface is disordered with a *Caries* or *Spina Ventosa*, you must by no Means take off the whole Limb, but remove that Part of the Bone only which is affected, in the same manner as we taught in the foregoing Chapter on the *Caries*, *Sec.* XVI. But when a large Bone, as the *Os Humeri*, *Tibia*, or *Femur*, or entire Joint of the Arm, Knee, or Foot, is diseased, there is no Remedy but Amputation; making your Wound in the sound Parts above all that is diseased: But we shall treat more fully of this Subject when we write on Chirurgical Operations.

When part only of a large Bone is foul.

When the whole Bone or Joint is diseased.

XVI. In certain Species of the *Spina Ventosa*, where the Tumor of the Bone will not yield to the Application which we have advised above, and you can come at it with your Hands, PETIT^d advises you to lay the Bone bare by a cruciform Incision, and to cut off the extreme Parts of the four Angles of the Skin: And when this is done, to dress with dry Lint. On the Day following you are to bore several Holes in the Tumor, so near each other, that it may be pierced like a Sieve: You are then to take the whole off with a Chissel and Mallet. The Wound is to be filled with dry Lint: And that the diseased Parts may separate the sooner from the sound, he orders the foul Part of the Bone to be dressed with a Solution of Mercury in *Aqua Fortis*. This Method is to be continued till you have obtained an Exfoliation. He is very high in the Commendation of this Process, and I think deservedly prefers it to any other Re-

Where the Tumor of the Bone will not give way.

^a SEVERINUS appears to be too fond of the actual Cautey in these Cases, *Cap.* 20. for frequently we cannot get to the Bottom with it, or the Parts are too much corrupted to expect Advantage from it.

^b LE DRAN, in *Obs.* 112. recites nearly the same Case, where he took off the *Metatarsus*, Toe, and all; but this should constantly be avoided where it is possible, for the Toe is of great Advantage in walking.

^c See in SCULTET. *Obs.* 90. the Case of a Thumb and Hand taken off for a *Spina Ventosa*.

^d *Lib. de Morb. Off.* *Cap. de Carie.*

medy in these Cases, even to the actual Cautey, where the Caries has not penetrated too deep.

How to remove an Exostosis.

XVII. When an acute Eminence or Excrescence, which is properly called an *Exostosis*, pushes preternaturally above the Bone, creating no Disturbance, Pain, or Deformity, and unaccompanied with *Caries* or *Spina Ventosa*, as I have frequently seen them; in my Judgment it is best to let it alone: For the Remedy will be worse than the Disease, and, by laying the Bone bare, you may bring on a *Caries* or other Inconveniencies. On the other hand, if it occasions any Deformity, impedes any Action, or produces Pain or other Mischiefs, you may take it off in the manner we have just taught above. You may see various Cases of *Caries*, *Spina Ventosa*, and *Exostosis*, in the Figures of that splendid Work, CHESELDEN's *Osteography*, from Plate XLI. to the End: In RUYSCH, *Obs.* p. 94. in his *Thesaur. Anatom.* VIII. *Tab.* 3. and *Thesaur.* X. *Tab.* II. and BIDLOO's *Oper. Anatom. Chirurg.* p. 208. *Tab.* II.

CHAP. X.

Of ULCERS of the HEAD.

What these Disorders are.

I. IT remains with me now to say something of Ulcers of the Head, and particularly of those which occupy its hairy Part, and are at this Time called either *Tinea*, *Favus*, or *Achores*: But the Professors of Medicine do not at all agree about the Signification of these Terms. By the Term *Favus*, we commonly understand Ulcers of the Head, that are full of Cavities like a Honey Comb. By *Achores*, those Ulcers which are full of small *Foramina*, which contain a moderately viscid Humour. Many call these Disorders *Tinea*, because, from the Abundance of small *Foramina* in them, they resemble moth-eaten Garments. But for the most Part, the Term *Tinea* at present is applied to a large d Scab, which Children and Infants are subject to upon the Head, full of thick foul Scales, and very offensive to the Smell: This sometimes extends itself to the Face, in which Case we call it *Crusta Lactea*. This is often benign and of a mild Nature, but sometimes ill-conditioned and dangerous. There is still a worse Kind of *Tinea*, or scabby Head, covering the whole hairy Scalp with an ash-coloured thick Crust, attended with a violent Itching, and stinks grievously: This is generally very difficult of Cure. Persons afflicted with this Complaint, have a very pale unhealthy Countenance. These Disorders are much more frequently met with in Infants and Children than in Adults. They are occasioned either by the Nurse's irregular Course of Life, or by the Child's being used to foul Feeding, from whence foul Blood is made, which produces Ulcers of this Kind. Sometimes they break out in an adult State, resembling a Kind of Leprosy, which is very difficult to cure. In the *Pox* you frequently find both Head and Face, particularly the Forehead, spread with dry Scabs, and scabby Ulcers, which is called a *Venereal Scabies*. Venereal *Gummata* also and *Tophs* of the Head, may be referred to this Class, since they frequently degenerate into Ulcers.

II. Though

II. Though the Ulcers which we have just described, differ from each other ^{Cure.} in some Particulars, yet I shall not speak separately of them in this Place, as they are to be cured pretty nearly in the same Manner. When they are slight, it will be proper to give a gentle Purge now and then, with the Addition of a small Quantity of *Mercurius Dulcis*; administering between whiles to an adult Patient, Decoctions of the Woods, with edulcorating Pills, Powders, or Essences. Infants at the Breast may take diaphoretic Powders: But their Nurses may prosecute this Intention with Powders, Pills, Decoctions, or Essences. Externally, you may anoint the Scabs with *Cremor Lactis cum pauca Cerussa preparata mistus*; or with *Oleum Ovorum* alone; or with the Addition of a small Quantity of *Oleum Cerae*; or with *Unguentum de Enula, de Cerussa, Diapompholygos*, or with any other of the same Intention: Observing at the same Time Regularity in Diet, and defending the Body from the Injuries of the external Air. By this Method, not only Ulcers of the milder Kind are healed, but even those of the more malignant Sort; especially if you give small Quantities of *Mercurius Dulcis* at the same Time, or mix *Mercurius Vivus* with your Ointments. But these Medicines are to be used with Caution.

III. In worse Degrees of this Disorder, especially where you cannot be per- ^{Another} suaded to use Mercurials, you will never succeed in your Cure, till you have ^{Method.} taken off all the Hair, with which these Ulcers have a strong Connection. In some Places it is the common Practice to pull out the Hair by the Roots, either by Degrees, or at once, with a *Pitch Plaster*^a, which is spread upon a strong Cloth, or upon Leather, and applied all over the Head, after the Hair has been cut off as far as the Scabs. When it has taken fast hold, they let it lie on for twelve or twenty-four Hours, and then they tear it off at once, and it brings away with it both the scabby Crust and the Roots of the Hair: But this cannot be done without great Pain and Effusion of Blood. When the Plaster is torn off, they wipe away the Blood with dry Lint, and anoint the Head with some *Oleum Laterinum*, with the Addition of a little *Oleum Cerae* warmed, and cover it with the *Emplastrum de Spermate Ranarum pauca Camphora impregnatum*; dressing in this Manner every Day, till the injured Parts are clean, and then they heal with *Oleum Ovorum vel Essentia Succini*^b. They prescribe internal Medicines to correct the Blood, such as you saw in *Sett. II.* and advise Regularity in Diet. Antimony either alone, or mixt with a small Quantity of *Flores Sulphuris*, is very serviceable in this Case. You should diligently avoid beginning with the Use of Mercurial or Sulphureous Ointments; because they are very apt to repel the noxious Humours, and endanger the Life of the Patient: Which Effect they are not observed to have, after you have administered Cleansers of the Blood for some Time internally.

IV. In scabby Ulcers of the Face, which happen in the Infant State, and are vulgarly called *Crusta Lactea* or *Achores*, the same evacuating and corrective ^{Cure of the} *Crusta* ^{Lactea.} Medicines are to be prescribed for the Nurses, which we ordered above *Sett. II.* The Infants themselves also should be purged frequently, and in the Intervals

^a JUNKER in his *Surgery*, p. 280. recommends a Plaster of Pitch, Scammony, and Resin.

^b WEDEL tells us, that the *Tinea* may be cured, and Vermin in the Head at the same time destroyed, by washing the Head over with liquid Pitch; applying previously internal Medicines. *Lib. de Morb. Infant.* p. 61.

between purging, should take diaphoretic Powders prepared *ex Antimonio Diaphoretico, Lapid. Cancrorum, Antimonio crudo, & Flor. Sulphuris*. When they have taken these Medicines for some Time, you may daub the scabby Parts with a Liniment made *ex Cremore Lactis cum Cretâ vel Cerussâ*; or in the room of this you may use *Oleum Ovorum cum pauco Olei Laterini*. Ointments prepared of Mercury or Sulphur are very dangerous in the Beginning of this Disorder, or to very weakly Infants. But if Remedies of this Kind should be used by unskilful Persons, which is frequently the Case, to the Detriment of the Patient, you must endeavour to strike the Humours out again by prescribing Sudorifics in different Forms, both to the Infant and its Nurse, till you have satisfied this Intention.

End of the FIRST PART.

INSTITUTIONS OF SURGERY.

THE PREFACE.

HAVING finished the first Part of our Institutions of Surgery, which treats professedly of the Five Kinds of Disorders of the Human Body, which require the Assistance of the Surgeon; to wit, Wounds, Fractures, Luxations, Tumors, and Ulcers; we shall proceed now to the Second Part, which is dedicated to Chirurgical Operations. And in this Volume we shall take an Opportunity to treat of such Disorders as remain undescribed, either as not properly belonging to any of the foregoing Heads, or such as require particular Contrivances and Machines to be made Use of in their Cure. In doing this we shall consult Order as far as the Nature of the Subject will admit of it. We shall first describe those Operations, which may be performed in almost all, or at least in various Parts of the Body; as opening a Vein, making Issues, applying the actual Cautery, taking off Excrescences or intire Parts of the Body. We shall then proceed to those which have their proper Situations, and happen each to one particular Part of the Body. In performing this Part of our Work, we shall begin with those which belong to the Head and each of its Parts, as the Cranium, Eye-lids, Eyes, Ears, Nose, Lips, Teeth, Gums, Tongue, Palate, Tonsils, Uvula, &c. Then we shall describe those Operations,

P p 2

The P R E F A C E.

rations, which are accommodated to Disorders of the Neck: From thence we shall proceed to the Breast, so on to the Abdomen, and its neighbouring Parts, to wit, the Anus and Pudenda of both Sexes. Lastly, we shall describe those Operations which are performed on the upper and lower Extremities. Notwithstanding the great Number of these Operations, and the various Methods of performing them, will render this Task extremely difficult, yet it shall be our principal Care to explain the Nature of each particular Operation, the best Method of performing it, and the fittest Instruments to be made use of for that Purpose, with all the Clearness that the Subject will admit of. By pursuing this Method, we shall not only teach the young Beginner the first and solid Principles of Surgery; but the Surgeon also who has already had some Experience in his Profession, will, I hope, find something in these Institutions, by which he may, in some Measure at least, perfect and adorn his Art.



I N S T I-

INSTITUTIONS OF SURGERY.

PART II. Of OPERATIONS.

SECT. I.

Of GENERAL OPERATIONS *practicable in several different Parts of the Body.*

CHAP. I.

Of PHLEBOTOMY *in general.*

I. **W**E begin with the Operation of *Phlebotomy*: Because it is of all the most general, performed in most Parts of the Body, and by much the most frequent in Use at this present Day. By *Phlebotomy* or Bleeding we here intend the opening a Vein, by a sharp-edged and pointed Instrument of Steel, for extracting a proper Quantity of Blood, either for the Preservation or Recovery of a Person's Health. Phlebotomy what.

II. Venesection appears to be not only one of the most useful, but most antient Operations in Surgery: Since we find, by the Writings of HIPPOCRATES, CELSUS, and others, that it was even celebrated near three thousand Years ago. Yet there have not been wanting some among the Antients, and Moderns, who have reviled this Practice, as both cruel and fatal to the Healths and Lives of Mankind, as ERASISTRATUS, PARACELSUS, HELMONT, PORTIUS, BONTEKOE, GEHEMA, &c. But I think all their Objections too weakly founded to need any Refutation; which might very well be made even only from the daily Experience we have of the great Usefulness of this Operation, in alleviating, preventing, and curing most Disorders of the human Body, especially those A most antient and useful Operation.

those of the acute and inflammatory Kind. The Operation is said to have been first hinted to us by the *Hippopotamus*, who, at stated Seasons, used to open a Vein with a sharp-pointed Reed, according to POLYDORÉ VIRGIL, *De Rer. Inventor.* p. m. 65.

Phlebotomy
often diffi-
cult.

III. Nor is the Operation in many Cases practicable with so much Ease and Safety as is commonly imagined. For though in some Patients the Veins lie so open and conspicuous, that even a Novice will find no Difficulty in making their Apertion; yet in others they are either so small or deeply situated, that the most expert Surgeon is sometimes at a Loss, and may, by Accident, miscarry. Add to this, that as the Arteries, Nerves, and Tendons, are frequently very nearly seated to the Veins, it is no uneasy Matter to injure one or other of them with the Instrument used in Bleeding: Which is quickly followed either with a profuse or fatal Hæmorrhage, an Aneurism, violent Pains, Inflammation, Fever, Mortification, or even Death. Phlebotomy therefore should be performed with no less Judgment and Caution, than the other important Operations in Surgery: Especially as the Reputation of a young Surgeon may suffer as much by Neglect or Accidents in this Way, as in many of the other less usual and seemingly more difficult Operations.

Qualifica-
tions of the
Phlebo-
tomist.

IV. A good Phlebotomist should have a steady, nimble, and active Hand, with a sharp Eye, and undaunted Mind; without which he may either be liable to miss the Vein, or commit some Accident that may be injurious or fatal to the Patient and his own Character. For these Reasons it is that Venesection is less readily practised by the Surgeon as he advances in Years: Because old Age is generally accompanied with a weak Eye and a trembling Hand.

Instrument
for Bleeding.

V. The Instrument which is in common Use amongst the Surgeons for opening a Vein is called a *Lancet*. The Shape of this Instrument is described at *Plate I. A.* and at *Plate XI. Fig. 5.* The Surgeon should take Care to be always provided with a sufficient Number of these, and to have them constantly in order, and to have some also of a larger Size. Thus he will be prepared for Veins in different Subjects. And as this is an Operation that frequently requires to be performed in a sudden, he will never be at a Loss. There are many Surgeons in *Germany*, particularly in *Franconia*, *Bavaria*, and *Lower Saxony*, who bleed with a *Fleam*, *Plate XI. Fig. 3.* which they use in this Manner. They hold one of their Fingers upon the Part B, and applying the Point A to the Vein, they strike the Part C with one of the Fingers of the other Hand, opening the Vein as Farriers do in Horses. Some of the Surgeons and Bagnio-Men use a neater Instrument, an *Elastic* or *Spring Fleam*, which the *Germans* call *Schnapper*, or *Schnapperlein*, *Fig. 4.* When they have drawn it up, they apply the Point A to the Vein, and then let it go by pressing upon B. Some again use a *Lancet* in the Form of a Dart, the Figure of which you may see in *CRONE de Venesectione*, p. 33. *Fig. 4.* But since the Position and Size of the Veins is different in different Subjects, we find that the most convenient Instrument for our Purpose is the *French Lancet*: Though many of our Surgeons are very expert in the Use of the *German Lancet*, *Fig. 3* and *4.*

In what
Part the
Operation
is to take
place.

VI. Though the Operation of Bleeding is frequently performed in different Parts of the Body, as in the Hand, Foot, Forehead, Temples, Neck, Tongue, Penis, and other Parts; yet it is most generally performed in that Vein of the Arm which lies near the Joint of the *Cubit*. Therefore we shall begin with teaching

teaching the Method of opening this Vein, and treat more fully of it than of any other.

CHAP. II.

Of OPENING the VEINS of the ARM.

I. **I**T is commonly enough known, that the Operation of Bleeding in the Arm is performed on the Veins that lie on the internal Part of the *Cubit*. Preparation for Bleeding. There are several Things worthy the Surgeon's Notice in this Operation: Some of which regard the Things that are to be done preparatory to Bleeding; some in the Operation itself; others immediately after the Performance of it. Of each of which we shall speak distinctly in their Order. Preparatory to Bleeding you should have in readiness, (1.) a *Linen Fillet*, about a *Paris Ell* in Length, and two Fingers in Breadth, with or without small Strings fastened at each End of it. (2.) Two *small square Bolsters*. (3.) *Porringers* or Vessels to receive the Blood. (4.) A *Sponge* with warm Water. (5.) Some *Vinegar*, *Wine*, or *Hungary Water*, to raise the Patient's Spirits if he should be inclinable to faint. (6.) Two *Assistants*, who must be void of Fear, one to hold the *Porringer*, the other to reach you any thing that you shall want. (7.) A *small Wax Candle*, when the Patient is to be bled at Night, or in a dark Place. (8.) You must place your Patient upon a *Couch*; or, if he is very fearful of the Operation, lay him up on a *Bed*, lest he should fall into a *Swoon*. (9.) Lastly, you should take Care that no Hair or the Cloaths of the Patient lie in your Way. The Patient himself should take Care that nothing should give him any Concern: And he should avoid terrifying himself with recollecting the Mischiefs which have happened by the unskilful Performance of this Operation. Lastly, the Operator should be as expert in bleeding with his left Hand as with his right. For, as you are readier at bleeding in the right Arm with your right Hand so when you are to open the Veins of the left Arm, you will find it necessary to use your left Hand: And there are some Patients who insist upon being bled in the left Arm.

II. Though the Operation is to be performed at once, with one Puncture, yet many things are to be observed in order to render it successful. First, it is necessary for the Surgeon to inspect his Patient's Arm diligently, that he may see the Course of the Veins: He must then take hold of the Arm, and extend it towards his Breast, tucking up the Sleeve about a Hand's breadth above the Bend of the *Cubit*, where he must make his Ligature, rolling the Fillet twice round, and fastening it with a Knot (*Plate XI. Fig. 1. D.*) The Veins being compressed, and the Blood being stopped in its return, they will enlarge, and lie fairer to the Eye. The Ligature generally used upon these Occasions is a Slip of fine Scarlet Cloth, but any other Colour will answer the Purpose as well. When you have bound up the Arm in this Manner, you let it go for a small Time till you have taken a *Lancet* out of your Case: And opening it so that it may make a Sort of an obtuse Angle, you take hold of it with your Teeth about the Joint (*A. Plate XI. Fig. 5.*) and hold it some time till the Veins grow turgid. You are then to lay hold of the Arm again in the same Manner as

as we directed before, and extend it to your Breast, having an Assistant ready with the Vessel in his Hand, at a convenient Distance for receiving the Blood.

What Vein
is usually
opened.

III. You are now to examine which Vein lies fairest, and is therefore most proper to be opened. For you must observe that in the Arm there usually appear three principal Veins: The first is called *Vena Cephalica*, and is found in the external Part of the Arm. See Plate XI. Fig. 1. A. The Second is termed *Basilica*, and lies on the internal Part of the Arm: In the right Arm it is also called *Hepatica*; in the left, *Splenetica*, See *ibid.* Letter B. The Third, which is obliquely situated between the former two, is called *Mediana*. See Letter C. The median and basilic Veins, as they are larger than the cephalic, discharge a greater Quantity of Blood, but are attended with more Danger in the Operation: For a considerable Artery and the brachial Nerve lie under the basilic Vein, and the Tendon of the Biceps Muscle under the Median. But as they lie fairer to the Eye, and are therefore more frequently the Subjects of the Operation we are treating of, than the cephalic Vein, it is safer and more eligible for the less experienced Surgeons to open the basilic, or at least the Median Vein. But sometimes the Veins are so situated in the Arm, that only one of them will lie exposed to View, which deprives you of all Choice. Your only Safety in this Case depends upon your Choice of a skilful and cautious Surgeon.

In what
Part the
Vein is to be
opened.

IV. When you have determined which Vein to open, you are to perform the Operation on that Part which presents itself fairest to you. But if the Vein has frequently been opened, and the Part which appears largest and fairest is full of Cicatrices, you are not to open above, but below the Cicatrices, by which Means the Blood will discharge itself more freely: For the Part above is generally straitened by the Cicatrix. For this Reason, whenever you open a Vein for the first Time, begin as high as you can, by which Means you will have the more room to descend in repeated Bleedings.

What is
to be done
immediately
before
Bleeding.

V. Before you apply the Lancet to the Skin, when the Veins are not risen, it will be proper to rub the Arm below the Bandage, which will drive the Blood back towards the Cubit, and render the Veins more turgid. Whilst this is doing in the right Arm, the Surgeon should take hold of the Patient's Arm in such a Manner that he may lay his Thumb upon the Vein which he intends to open, to prevent the Blood from flowing back, and to keep the Vein from rolling. You are now to fix your Eye upon that Part of the Vein which you intend to open, and taking the Lancet out of your Mouth with your right Hand, so placed that the Thumb and first Finger may be fixed about the Middle of the Blade: The other Fingers should rest gently upon the Patient's Arm, to prevent your Hand from slipping.

How the
Puncture is
to be made.

VI. Your Lancet is now to be pushed lightly and carefully forward by your Thumb and fore-finger, till it has penetrated through the Coats of the Vein; and at that Instant to be raised a little upwards in order to enlarge the Orifice of the Wound, which will give a freer Passage to the Blood. The most common and convenient Size of an Orifice is about twice the Breadth of the Back of an Ordinary Knife. You are to keep even between the two Extremes of Rashness and Timidity in making the Puncture. For as in one Case you will only divide the common Integuments, and so leave your Work undone: So in the other you will run the Risque of wounding the Artery, Nerve, or Tendon.

The

The Vein may be opened in three Directions. Some open it in a strait Line, *Plate XI. Fig. 2. Letter A.* Others transversely *B*: But most Surgeons make an oblique Wound *CD*. If the Vein is to be opened in the left Arm, the Surgeon must change Hands, and do all with his left Hand, which we have directed above to be done with the Right. If you are to bleed with the *German Fleam*, place the Point *A* upon the Vein; and taking hold of the Extremity *B* with your left Hand, drive the Point of the Fleam into the Vein by a Stroke with one of the Fingers of your Right Hand. But if you will phlebotomise with the Spring-Fleam, *Fig. 4.* you cock it, by elevating the Hook *c*; and placing the Point *A* upon the Vein, by letting loose the Spring, it is by a gentle Pressure plunged into the Vessel.

VII. Your Aperture being thus made, and the Instrument drawn instantly back, the Blood will then rush forth from the Orifice either in a large or small Stream: Hereupon your Instrument must be deposited in the Basin or Dish, and not thrown upon the Bed, lest it should be lost, or else injure the Patient. In the mean time the Blood must be permitted to flow as long as it shall be judged useful or necessary: And if it should stop too soon, as it often may from too great a Stricture of the Bandage on the Arm, it must be slackened a little, by which means the compressed Artery being set at Liberty, the Blood will flow from the Orifice as at first. If you find the Orifice obstructed by too great a Tension of the Skin, or an Intrusion of the *Membrana Adiposa*, you ought in that Case to return the bit of Fat, by pressing with the Finger or a warm Sponge, and to relax the Skin by bending the Arm a little. Lastly, if the Orifice be obstructed by thick, grumous, or congealed Blood, that Impediment may be removed by wiping it with a Sponge dipt in warm Water.

VIII. But that the Patient's Arm may not become painful or languid, by holding it long extended, the Surgeon should support it by the *Cubitus* for a little while; and then give him a Stick, or other cylindric Body, to turn round in his Hand, that by the Contractions of the Flexor and extensor Muscles of the Fingers, the Course of the Blood may be accelerated towards the *Cubitus*: Which will be still further promoted, if the Patient urges a little voluntary Cough. In the mean time his Attendants should stand ready with other empty Cups or Vessels for receiving the Blood, to carry off such as are full, and administer the Dressings for the Deligation, with cordial Water, and other such Necessaries.

IX. The Quantity of Blood necessary to be taken from the Vein at one Bleeding, must be determined by the Physician, from considering the Patient's Disorder, Strength, Habit, and other Circumstances. But when the Surgeon attends his Patient without a Physician, he may then safely proportion this Evacuation himself at his own Discretion, by reflecting on the Nature of the Patient's Case, his Age, Strength, Course of Life, and fulness of Habit, &c. for he may permit the Patient, that shews no Paleness of Countenance, nor Diminution of Strength or Spirits, to bleed longer than those that quickly grow faint, &c.

X. When there seems to be a sufficient Quantity of Blood discharged, the Ligature must then be immediately taken off from above the Elbow, and the Skin about the Orifice must next be gently stroaked or pressed together by the two fore-fingers of the left-hand: By which means the Lips of the divided

Qq

Vein

Treatment
after Aper-
tion.Method of
closing and
binding up
the Orifices.What must
be done by
the Patient
and his At-
tendants.The Quan-
tity of Blood
to be taken,

Vein are more easily compressed and closed. But while the Surgeon is doing this with his Left Hand, he takes the smallest of the two Compresses brought to him by the Servant, and applies it upon the Incision with his Right-hand. But so as to let what little Blood may remain betwixt the Orifice and the Vein, be discharged, before he imposes the Compress. Over the first or small Compress he should impose another that is a little larger, pressing them both gently on the Orifice with his left Thumb, till the Bandage is laid across. But before the Deligation is performed, according to the Directions we shall give for that Purpose in the last Part of our Surgery, on Bandages, it will be a Piece of Neatness and Decency in the Operator, to wipe off what Blood may have adhered to the Arm with a wet Sponge or Napkin, and then to go on with his Bandage. There are indeed many Surgeons who apply but one Compress, which they first wet in Water, Vinegar, Wine, or its Spirit: Though, in my Opinion, two Compresses make the Deligation more firm and secure: Though I think it is no great Matter whether they are applied wet or dry; the dry will fit easiest on the Part.

Treatment
after Deli-
gation.

XI. Having applied your Bandage, and drawn down the Patient's Sleeve over his Arm: He should be ordered not to use it too early or violently, before the Orifice is well closed, which might excite a fresh Hæmorrhage, an Inflammation, Suppuration, or other bad Accident. And if the Patient should faint away soon after the Operation, it may be then convenient to wet his Nostrils with *Hungary* Water or Vinegar, and to sprinkle some of the last, or else cold Water, in his Face: And especially in Summer-time to let in the fresh and cool Air, by opening the Windows, &c. Also, if any Wine or cordial Water be at hand, you may give the languishing Patient a small Draught thereof; and then the Surgeon will have nothing more to do than wash his Hands, and the Instrument, before he puts it up in his Case.

Judgment
passed on the
Blood.

XII. In the next Place, it is often customary to ask the Opinion of the Surgeon or Physician present, concerning the healthy or morbid State of the Blood, from external Appearance. In this Case the Surgeon should always make a good refuge to his Patient and By-standers, even though the Blood should appear bad: For it is not easy to express the good Effects that may follow from clearing up the Patient's Mind, which is much better than to leave a heavy Impression on it by a severe Prognostic. Therefore, if the Blood appear florid, the Surgeon should declare it a Sign that the Patient either is, or speedily will be in good Health. If the Blood appears vitiated, or of a bad Colour, he must then pronounce the Bleeding will be extremely serviceable to him. If the Patient should, in the mean time, be in a Swoon, the Surgeon should take Occasion even from thence to signify the great and speedy Effect the Discharge will have towards the Recovery of the Patient's Health. When such or the like encouraging Discourse has been passed, the Blood should be set by in a cool Place, till the Physician or Surgeon renews his Visit.

Whether
the Patient
may safely
drink or
sleep after
Bleeding.

XIII. If the Patient should be thirsty after Bleeding, you ought not to deny him the Pleasure of drinking, especially thin Liquors. The *French* make it a Custom to give the Patient a large Draught of Cold Water after Phlebotomy in inflammatory Disorders: In which Cases, if the Patient be of a warm Habit, that Practice may be extremely beneficial. But in cold and weak Habits, it ought not to be encouraged: For them it will be better to give some warm
Sup-

Suppings of Tea, Coffee, or the like. If any body should propose the Question, Whether the Patient may sleep safely after his Bleeding, your Answer may be either in the Affirmative or Negative, according to particular Circumstances. If the Evacuation was made by way of Prevention, or to preserve the Body in its healthy State, it will be more adviseable for the Patient to shake off his sleepy Disposition by walking, or engaging in some agreeable Sport or Exercise: Because if Sleep be indulged, the Bandage may get loose, or slip up above the Orifice, and sometimes thereby occasion a profuse and dangerous Hæmorrhage. This Objection ought not, however, to deprive the Patient of a comfortable Repose, in case of great Weakness and Indisposition; especially if he has had no Sleep for a long time before: Then it would be denying him a Benefit perhaps greater than the Remedy of Bleeding itself. But for the greater Security, it may not be amiss to let the Nurse, or some body, have a watchful Eye over the Patient during his Repose; that in case of such an Accident, timely Relief may be had by compressing the Vein with one's Finger till the Surgeon can be called.

XIV. When the Surgeon or Physician comes again to visit the Patient, the Blood is usually set out again to have a fresh Judgment passed upon it: In which Case the Verdict given ought to be such as will exhilarate the Patient, and not depress his Spirits, agreeable to what we said before on this Head at *Sect. XII.* The Surgeon must in the next Place inspect the Deligation, to see if the Bandage be too loose: And in taking it off, if the Compress adheres to the Lips of the Orifice, he ought not to force it away, but to apply his Bandage over it again as before. After waiting a Day or two longer, it will spontaneously separate, or fall off from the closed Orifice, which will by that time be near cicatrized. There are some, who being prejudiced in Favour of the enthusiastic Doctrine of Sympathy, will have their Blood run into cold Water, or have cold Water poured upon it, in febrile Complaints, thinking by that means to allay the Heat of the Blood. In this Respect it may be of service to humour and satisfy their Minds, though there may be nothing in the thing itself.

Behaviour
in your
After-visits.

CHAP. III.

Of PHLEBOTOMY in the HAND.

I. **T**HERE are two principle Veins in the Hands, which with us in Germany are sometimes opened to bleed the Patient. The one is called *Salvatala*, and runs on the Outerside of the Back of the Hand towards the Little Finger, being sometimes denominated *Splenica* by the Antients, who judged its Apertion extremely useful in Melancholy, and Disorders of the Spleen. The other Vein, which is termed *Cephalica*, runs betwixt the Thumb and Forefinger, and was formerly so denominated from an Imagination, that bleeding from it was more particularly useful than from others in Disorders of the Head. But we are at present convinced those Notions of the Antients were without Foundation; and though the Patient is bled more difficulty and slowly by these Veins, yet the Effects will be the same as after Phlebotomy in the Arm. Yet

What Veins
are opened
in the Hands.

it may be sometimes convenient for the Surgeon to open them either at the particular Request of the Patient; or when the Veins of the Arm are very deeply or obscurely situated, and these lie fair and conspicuous for Incision. To which we may add, that Women, in many Parts of *Germany*, pregnant, especially, toward the latter End of their Time, generally choose to bleed by this Vein, from an Imagination that it occasions less Injury or Weakness to the Fœtus.

Method of
phlebotomising in the
Hand.

II. When you are therefore determined from particular Reasons to phlebotomise in the Hand, the Patient must first hold it in warm Water for some time, rubbing it therein well with his other Hand, in order to make the small Veins become turgid and conspicuous. After this you are to fix a Ligature upon the *Carpus*, that the Veins may continue in that Manner distended. When the Hand has been wiped dry with a Napkin, you make an Apertion in the most convenient Part of the Vein in the Manner we directed for Veins in the Arm. If the Blood does not flow copiously from the Orifice after Incision, the Hand should be placed again in hot Water, and taken out when the Discharge is judged to have been sufficient. This done, the Hand is wiped dry with a Napkin, the Orifice defended with two Compresses, and your Bandage applied as we shall direct in *Part III. Chap. VI. Sect. X.* on Bandages.

C H A P. IV.

Of BLEEDING in the FOOT.

The Veins
opened in
the Foot.

I. BLEEDING in the Foot is an Operation of very old standing. It having been an Observation made by the most antient Physicians, that Phlebotomy in this Part proved highly serviceable in most Disorders of the Head and Breast, and for an Obstruction of the menstrual and hæmorrhoidal Flux: Upon which Discharges greatly depended the healthy State of both Sexes. For these Reasons they therefore denominated those Veins of the Foot, *Saphena* and *Cephalica*: The last of which extends itself from the internal Ankle to the great Toe; and the first, from the external *Malleolus* to the smaller Toes. But why one of them should be thought or denominated more cephalic than the other, there is not the least Reason to be offered; since bleeding from either of them has altogether the very same Effect. Therefore, in my Opinion, the Surgeon should always open that which lies fairest and most conspicuous. But if the Veins upon the *Metatarsus*, or Instep of the Foot, do not well appear, it may be then convenient to open one of those at the Ankle, or about the Calf or Ham of the Leg, as I have frequently done myself. Nor is the Phlebotomist so liable to injure any of the Tendons in these last Parts as he is upon the *Metatarsus*. In the mean time the Operator should, in single Women, expect the Order of some prudent Physician for his bleeding by these Veins: Because some of them, who are evil-minded, endeavour by this Means to procure a Miscarriage; which, when known, might make the Phlebotomist a Sharer in the ill Report.

II. For

Sect. I. *Of BLEEDING in the FOOT.*

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II. For the more easy and successful Apertion of these Veins, the Patient must first wash both Feet well for some time in hot Water: That when the Veins become sufficiently turgid, the Surgeon may take his Choice of that which presents fairest either in the Right or Left Foot, without paying any Deference to the Distinction of Right or Left, in any of the forementioned Disorders. For the Effect, as we observed, will be the same in either, if they are disposed with equal Advantage for Apertion. Having fixed upon the particular Foot and Vein, your Ligature must be applied about two Fingers Breadth above the Ankle; and then the Patient must return it into the warm Water while the Surgeon takes out and prepares his Instrument or Lancet. Then kneeling down on one Knee, the Surgeon takes out the Patient's Foot from the warm Water, and having wiped it dry with a Napkin, places it upon his other Knee, or else upon a Board laid over the Vessel of hot Water. He now fastens or secures down the Vein from slipping with his Left Hand, as in *Chap. II. Sect. V. & seq.* But if the Veins do not appear well under the Ancles, the Ligature must be removed higher, about two Fingers Breadth above where you intend to make the Apertion of the Vein which best offers itself. 'Tis to be also observed, with regard to the Surgeon's Posture, that he may seat himself on a low Stool or Chair, and place the Patient's Foot in the most advantageous Manner upon either Knee. This Method will be preferable to the other in Bleeding with the Spring-bleam, as many do in *Germany*: Or the Patient may here set the Foot for the Operation upon a low Stool, or any other Support.

III. The Blood from the Vein thus opened may be received into a Glass Cup or Bason: And if it does not flow freely from the Orifice, the Foot should be returned into the warm Water; which will either prevent or dissolve the congealing of the Blood that in this Case often obstructs the Aperture. When a sufficient Quantity of Blood has been thus drawn, which may be known partly from the Time, and partly from the Largeness of the Stream, as also from the Redness of the Water, and Condition or Strength of the Patient; the Orifice is then to be closed by the Finger, and, after drying the Foot with a Napkin, to be secured by Compresses and Bandage. Concerning the Usefulness of Venesection in the Foot, consult the Dissertations of PERDUCIUS, HEREDIA, and STAHL, who have been opposed by HECQUET, in *Lib. sur la Saignée du Pied*. Paris. 1724. The first have been again seconded by Jo. Bapt. SILVA Medic. Paris. in *lib. de l'usage des différentes sortes des Saignées*, Amstelod. 1729. Animadversions against this last were also published at Paris in 1730, by M. CHEVALIER, Physician, and QUESNAY, a Surgeon there.

CHAP. V.

Of BLEEDING in the Veins of the FOREHEAD, TEMPLES, and OCCIPUT.

I. **T**HERE are many Physicians and Surgeons, who think that bleeding by the Veins of the Forehead and Temples is much more serviceable and expeditious in relieving all Disorders of the Head, such as violent Pains, Vertigo, Delirium, Melancholy, and Raving Madnes, &c. than the like Discharge

When and how these Veins are to be opened.

by

by Veins more remote from the Parts affected; judging that their Vicinity renders them more capable of evacuating the offending Matter of the Disease. But, for my own Part, I must frankly own, that to me there seems to be little or no Foundation to expect any considerable Difference in the Effects of Bleeding from these Veins, in order to a more expeditious Removal of such Disorders: And this because the external Veins of the Forehead and Temples have little or no Communication with the Brain and internal Parts affected, and do generally yield but a small Quantity of Blood. In my Judgment, Bleeding by the jugular Veins seems more likely to answer that Intention, as they receive the Contents not only of the forementioned Veins, but also of those immediately spent on the Brain and Parts affected, and are also more large and conspicuous for Apertion. Yet if the Surgeon be expressly ordered by the Physician to phlebotomise in the Forehead or Temples, in compliance therewith, he ought to observe, that before he proceeds to incise the Veins, an Handkerchief or Neckcloth ought to be drawn tight round the Neck; that, by compressing the jugular Vein, those Branches of it may become more turgid and conspicuous. The Vein being opened, the Patient must hold down his Head, that the Blood may not trickle from his Forehead into his Eyes or Mouth, when the Stream does not spin out with sufficient Force. If the Blood does not stop of itself after a due Quantity is discharged, you must compress the Orifice with your Finger; and, after wiping the Forehead and Face, apply a Compress or two, and then your Bandage.

Phlebotomy
in the Occi-
put.

II. Bleeding from the occipital Veins, which communicate with the lateral Sinusses of the *dura Mater*, is both by Reason and Experience proved to be serviceable in most Disorders of the Brain, where that Part is overcharged with Blood, which may be this Way diverted and evacuated. The celebrated Anatomist MORGAGNI^a especially recommends it, with Scarification and Cupping in those Parts, for all lethorgic Disorders: And ZACUTUS LUSITANUS gives an Instance of a desperate Apoplexy removed by deep Scarification and Cupping upon the *Occiput*, *De Medic. Princip. Hist. Lib. I. Hist. 33.* These occipital Veins are opened by the same *Apparatus* as the Vein of the Forehead.

CHAP. VI.

Of BLEEDING in the VEINS of the INNER CORNERS OF THE EYES.

When and
how these
Veins are to
be opened.

IT is well known from Inspection, and the Writings of Anatomists, that there are two Veins which run one on each Side the Nose through the *Canthi Majores*, or inner Corners of the Eyes; which proceed partly from the Forehead, and partly from the Eyes, and do, like the frontal Vein, discharge their Blood down into the external jugular Veins. 'Tis^b bleeding in these canthal Veins that has been universally approved by DIONIS and the Generality of Oculists for Inflammations and other Disorders of the Eyes: But upon no better Foundation in my Opinion, than that of bleeding in the Forehead and Temples, (*Chap. V.*) However, when you are to phlebotomise in these Corners of the

^a *Adversar. Anat. VI. Animadver. 83.*

^b See his *Surgery*, Edit. 2. p. 494.

Eyes, you must first make a Stricture about the Neck; and, after your Incision, the Patient must incline his Head, that a sufficient Quantity of Blood may be discharged from the Orifice without running into his Mouth: And then you apply a thick triangular Compress with Bandage. As for bleeding in the Veins of the Eyes, we shall consider that in treating of the Disorders incident to that Organ.

C H A P. VII.

Of BLEEDING in JUGULAR VEINS of the NECK.

I. **I**T has been a very antient Practice to bleed in the external Jugular Veins of the Neck, for most inflammatory Disorders of the adjacent Parts, for a Quinsey^a, Phrenzy, Madness, Ophthalmia, Apoplexy, inveterate Head-achs, Lethargy, and other Disorders of the Head. Nor are there wanting many among our modern Surgeons and Physicians to encourage the same Practice, and that even from the Authority of Reason and Experience: Since the accumulated and obstructed Blood and Humours may be this Way discharged from the Parts affected, and their bad Consequences prevented. Nor is the Operation at all dangerous; since the Jugular Veins run on each Side the Neck from the Head to the Clavicles, immediately under the Skin, and appearing generally very large, they may be easily perceived and opened: Before which you must make a Stricture upon the lower Part of the Neck with a Handkerchief, Neckcloth, or the common Ligature, which must be drawn tight by an Assistant or the Patient, to make the Vein turgid and conspicuous. Or you may place a loose Bandage about the Neck, and let it be drawn downward strongly over the Patient's Breast, either by himself or an Assistant: By which Means the Jugular Veins will be compressed on each Side, and become turgid without occluding the *Trachea*, or obstructing Respiration^b.

When and which Veins of the Neck are opened.

II. When the Jugular Veins have been by this Means rendered turgid and conspicuous, either of them which appears plainest may be secured by the Finger for Incision, either in the Right or Left Side of the Neck indifferently; when the Disorder lies in the whole Head, or in the Neck and Fauces. But when only one Side of the Head, or one Eye is affected, I think the Vein ought to be opened on the disordered Side of the Neck. The requisite Quantity of Blood being taken, the Ligature is next removed, and the Orifice compressed with your Finger, if the Blood does not stop without, while you wipe clean the Neck, and then apply your Compress and circular Bandage. Thus the Blood stops without any Danger of a fresh Hæmorrhage, of which some are without Reason afraid, as I have often experienced. Lastly, it must be acknowledged that the Patient faints away as readily after bleeding in the Neck, as the Jugular Veins are safely and easily opened: But no Danger follows from

The Manner of incising the Jugulars.

^a GOWEX reckons it a specific in this Case. See his *Surgery*, p. 274.

^b While I am revising these Sheets for the Press, occurs a Woman to whom I prescribe bleeding in the Jugulars for a violent *Ophthalmia*; but upon applying the Ligature to her Neck, there is no Appearance of the Veins, an Accident I never before met with.

thence.

thence. We have an excellent Treatise on the Usefulness of bleeding from the Jugulars, published at *Breslaw* in 8^{vo}. 1735, by TRALLESIIUS, a learned Physician of that City.

Of BLEEDING in the VEINS, called *Ranulæ*, under the Tongue.

IT is very often found of no small Service in a Quinsey, or other inflammatory Disorder of the Neck to bleed in the two small Veins which run under the Tip or End of the Tongue: Especially if a larger Vein has been opened before, either in the Neck, Foot, or Arm, whereby the inspissated and stagnating Blood may be gradually evacuated. To bleed in these Veins, a Stricture being made upon the Neck as before, you then elevate the *Apex* of the Tongue with your Left Hand, while, with the Lancet in your Right, you circumspectly open first one, and then the other on each Side: Because the Apertion of one only will hardly ever discharge Blood enough to give any considerable Relief. When you judge a sufficient Quantity of Blood has run out of the Mouth into your Vessel, remove the Ligature from the Neck: Upon which the Flux usually stops of itself. But if it should still continue, let the Patient take a little Vinegar, or *Frontinac* Wine in his Mouth: Or else you may apply a bit of Vitriol or Allum, or a Compress dipt in some styptic Liquor, till the Hæmorrhage ceases: Which can never be dangerous even without such Topics. For if there be not a good large Quantity of Blood discharged in the inflammatory Disorders of these Parts, the Apertion of these Veins will be of little or no Signification. Yet there are Instances where Patients have died for want of stopping Blood in these Veins. See *Mix. Nat. Cur.* A IV. *Obs.* 101. and *Ephem. N. Cent.* I. p. 188.

CH A P. IX.

Of PHLEBOTOMY in the PENIS.

BLEEDING in the *Vena dorsalis Penis* usually surpasses the Benefit of all Remedies whatever in abating inflammatory Disorders of this Member. This large Vein, which runs along the Back or upper Side of the *Penis*, being generally pretty much distended, and conspicuous in an Inflammation of this Part, may be incised about the Middle or back Part of the *Penis*; and kept bleeding till the Member becomes flaccid, and a sufficient Quantity of Blood be discharged proportionable to the Urgency of the Symptoms. This done, you must apply a Compress, and the Bandage proper for the *Penis*, as we shall direct in the third and last Part of our Surgery. But you must carefully endeavour to avoid injuring the Arteries or Nerves which enter the *Penis* near this Vein: As also not to make your Bandage too strict. For by these Means the Inflammation and Symptoms may turn out worse than before.

Of

Of the SYMPTOMS or ACCIDENTS which attend
PHLEBOTOMY.

C H A P. X.

Of an ECCHYMOSIS.

I. **M**ANY are the Accidents which may follow from the Apertion of a ^{Ecchymosis, what.} Vein. But we shall here only consider the Principal, and begin with an Ecchymosis, or Extravasation of Blood from the Vein betwixt the Flesh and the Skin: Of this there may be various Degrees: So that the Arm hereby often becomes not only much swelled, and of a black and blue Colour, but is even sometimes violently inflamed with a most acute Pain, and followed either with a Suppuration, or incipient Mortification in the Limb.

II. The Accident we are now treating of frequently proceeds from the Vein ^{Causes.} having been cut quite asunder by the Phlebotomist: But oftner from the Patient's using his Arm too early after bleeding, in violent and long Exercises; in which the Contractions of the Muscles make the Veins swell, and force their Blood through the Orifice into the Interstices betwixt the Flesh and Skin, either in a greater or less Quantity, in proportion to the Degree of Violence and Exercise.

III. In a slight Ecchymosis or Effusion of Blood under the Skin, there is ^{Consequences of a slight Ecchymosis.} little or no Danger to be feared, as the stagnant Blood may be generally dispersed without any great Difficulty by the Application of a Compress dipt in Vinegar and Salt, or in Spirit of Wine. Sometimes the Blood suppurates or turns to Matter, which may be much promoted by a *Diachylon* Plaster: And when the Matter is once brought to Maturity, it generally makes its own Way through the Integuments, without the Assistance of any Incision: After which, being discharged, the Wound may be healed with a bit of *Diachylon* Plaster.

IV. If the Quantity of Blood stagnating in an Ecchymosis be very large and considerable, there is generally but little or no Hopes left to disperse it: But ^{Treatment of a large Ecchymosis.} the Disorder too often terminates either in a large Abscess or a Gangrene, after violent Pain and Inflammation have preceded. But to prevent these Consequences, the Surgeon must take his Scalpel, and scarify, or make many little Incisions upon the livid Part to discharge the extravasated Blood; and then apply either a *Diachylon* Plaster, or the Fomentation before recommended for Contusions and Phlegmons, *Part I. Book I. Chap. XV. Sect. X. & seq. Book IV. Chap. II. Sect. XIV.* But if the Arm is already possessed with a violent Inflammation or Gangrene, you ought to scarify it well, and then to invest it with discutient Cataplasms or Fomentations, as we before directed in *Part I. Book IV. Chap. XIV. Sect. VI.* But at the same time in these Cases it is often necessary to bleed in some other Part, and to administer attenuating Medicines internally, till the Inflammation abates, or the Gangrene spreads no farther. You will see more on this Subject, *Chap. XII. Sect. XVI.*

CHAP. XI.

Of the PUNCTURE of a NERVE or TENDON in Phlebotomy.

Signs of this Accident.

I. **W**HAT grievous and cruel Symptoms may arise from the pricking a Nerve or Tendon, we have before intimated, in treating of Wounds, Part I. Book I. Chap. I. Sect. X. and XI. But you may reasonably judge, that a Nerve or Tendon has been injured in Bleeding, if the Patient, at the Time of Incision, feels a most acute Pain, so that he can scarce refrain from a severe Out-cry. In a short Time after, the excruciating Pains still continuing, the Limb swells, becomes inflamed, convulsed, stiff, and extended as in the Cramp; which Symptoms, if not timely relieved, threaten Convulsions of the whole Body, a Gangrene of the Part, and Death itself.

Treatment.

II. Among the several Methods of treating these Symptoms, from such an Accident, that seems to be one of the best, which was formerly used for the French King, CHARLES IX. by his Surgeon AMB. PAREY. For the King had no sooner declared his intense Pain, by crying out aloud, while the Vein was opening, than PAREY imagined, with good Reason, that some Nerve was injured: And accordingly, the Arm began to swell in a little Time with excruciating Pains, and at length became quite rigid. Hereupon the King's Physicians were immediately called in to a Consultation with PAREY, and the Treatment agreed on was first to bathe the Part injured with warm *Ol. Terebinth cum Sp. Vin. rect.* and then to invest the whole Arm in *Emplastr. Diachalciteos in Ol. & Acet. Rosar. solut.* retained by the expulsive Bandage, which, beginning upon the Hand, ascends gradually by spiral Turns to the Top of the Shoulder. By this Means the Impulse of the Blood on the Part was not only much abated, but also the Pain and Inflammation much diminished. And lastly, to compleat the Cure, the following Cataplasim was ordered to be applied to the Arm:

R. F. Hord. Orob. ana ʒij. Flor. Chamamel. Melilot. ana Mij. Butyr. recent. ʒjss.

These boiled into a Cataplasim with Soap-suds, were applied to the Arm, till the Pain, and other malignant Symptoms, were totally removed. Notwithstanding which, the King had a Stiffness in moving his Arm for near three Months afterwards: But, by Degrees, that went off, and his Arm grew as strong and agile as ever.

A second Method of Cure.

III. Equal Success may be also expected from treating the Part with warm Hungary Water and *Bals. Peruv.* for several Days, till the Pain goes off: And as the *Diachalciteos* Plaster is seldom retained in many of the Apothecaries Shops, you may substitute *Emplastr. de Minio vel Saturninum & Diapompholygos.* But great Care must be taken, in the mean time, while these Remedies are preparing, not to expose the Wound open to the Air. Therefore the Wound may be at first covered with a bit of any Sort of Plaster, and the whole Arm invested with a Linen Cloth moistened with Oxycrate; which will both abate the Inflammation, and exclude the Injuries of the Air or Dust from the Part. If the Patient be young, and of a full Habit, it will be also proper, at the same time

time, to bleed plentifully in the other Arm. SCULTETUS, *Obs.* 83. has an Ointment which he much extols for Punctures of the Nerves, as you may there find: Where he also relates, that he has several Times successfully cut through, or totally divided, such punctured Nerves.

C H A P. XII.

Of WOUNDS of the ARTERIES in PHLEBOTOMY.

IN Bleeding, it sometimes happens, that an Artery is pitched upon and opened instead of, or together with, the intended Vein, and this more especially when the Surgeon bleeds in the basilic Vein of the Arm; near to which usually runs the large brachial Artery^a, an Apertion whereof must be followed with a dangerous Hæmorrhage, an Aneurism, or even Death. This HILDANUS^b, with myself and others, has often observed, either from the profuse Hæmorrhage, or from a Sphacelation of the Limb from the Course of the Blood being interrupted. That an Artery is thus accidentally opened instead of a Vein, you may discover by the Blood's spinning very forcibly from the Orifice, by Starts or Leaps, rather than in an even Stream, and extending itself into a greater Arch from the Orifice to the Receptacle: The Colour of the Blood is also here much more florid, or of a brighter red, than that from a Vein. To which add, that if you here press your Finger on the Vessel below the Orifice, the Blood starts out more violently than before, and quite stops; or else greatly diminisheth upon pressing above the Orifice. The Reverse of this is found in the Apertion of a Vein.

II. In case of such a dangerous Accident, the Surgeon must first endeavour to keep up his Presence of Mind, which is very apt to be confuted by Fear, that thereby the Patient, or his Attendants, may not suspect his Error. In the next Place, he must carefully observe, whether the Blood flows freely from the Orifice, or whether it insinuates, in a considerable Quantity, betwixt the Integuments. If the first, he must take a large Quantity of Blood, even till the Patient faints, persuading him and his Attendants, that his Blood appears so hot and redundant, as to make so large an Evacuation absolutely necessary, after the Example of M. DIONIS^c, when he met with this Accident. When the Patient is in a Deliquium, as the Flux then ceases, you may commodiously dress and bind up the Wound, and by this Precaution hinder a fresh Hæmorrhage, or an Aneurism. While the Attendants are otherwise employed, the Surgeon must place a Farthing, or some other Piece of Money, in the Folds of the first Compress, which being fixed on the Orifice of the Arm wiped clean, he must, upon the first, place two, three, or more thick Compresses, each larger than the other: And then bending the *Cubitus*, he must, for the greater Security, apply two Bandages, in the same manner as after bleeding in a Vein, only a little tighter. It may be next proper to lay a thick, long, and narrow Com-

What the Surgeon must do in such a Case, when undisturbed to others.

^a But I have also sometimes observed this Artery near the Cephalic Vein.

^b *Obs.* 44. *Cent.* III. & LANCISIUS, *Lib. de Cord. & Aneurism.*

^c In his *Surgery*; *Chap. of Venesection.*

press upon the Arm, over the Artery, from its Incision to the *Axilla*, and to secure it in that Position by a spiral Bandage: That the brachial Artery being thus compressed, the *Impetus* of the Blood on the Wound may be abated; signifying to the By-standers, that the Patient's Blood is so ardent and rapid, that it cannot well be restrained from bleeding again, without this particular Deligation. Thus perhaps his Error may escape unsuspected. Instead of the first Compress with a Piece of Money, you may apply with equal, or more Advantage, a Lump of brown Paper chewed in your Mouth, and then the Moisture pressed out of it, secure it on the Orifice by several Compresses, and the Bandage as before.

Treatment
of the Pa-
tient after-
wards.

III. The Deligation being compleated, if the Patient does not then recover from the Swoon of himself, the usual Means are to be used to recover him, by sprinkling cold Water in his Face, opening the Windows, applying Volatiles, Vinegar, or *Hungary* Water to his Nostrils, &c. By which means, being brought to himself, he must be strictly charged to refrain from Exercise, to live on a spare and thin Diet, and not to use his Arm for some time, lest a Relaxation of the Bandage might occasion a fresh Hæmorrhage, or an Aneurism. To avoid this, it may be also requisite to suspend the injured Arm a little bent in a Sling about the Patient's Neck: And to keep it the more steady, the Sling may be pinned to the Patient's Clothes, and at Night laid in a convenient Posture on a soft Pillow.

Frequent
Visits ne-
cessary.

IV. A few Hours after the Deligation, the Surgeon ought to visit his Patient, and again, at short Intervals, as often as he conveniently can, in order to inspect the Arm and Bandage, to see that the latter sits tight, and to prevent the Insult of a fresh Hæmorrhage, Pain, Tumor, Inflammation, Gangrene, or other bad Symptoms. If every thing appears right, except only a small, uniform, and soft swelling of the Arm, the Bandage ought nevertheless to remain on the Arm, till the fourteenth Day: For such a Swelling does not presage any thing amiss, even though it infects the whole Arm. But if your Bandage is perceived to get loose, it ought to be taken off cautiously, and re-applied more closely. But while the Bandage is taken off from the Arm, the Artery ought to be compressed by the Tourniquet, or at least by the Thumb of an Assistant, grasping the Arm; the Surgeon in the mean time holding his Thumb or Finger pressed on the Wound, till he re-applies either the same or fresh Compresses and Bandage. But in this you must be careful not to force off the last Compress or Lump of brown Paper from the Incision, if it does not fall off of itself, but rather let it remain. However, if it should separate, you may dress the Wound with a little *Bals. Peruvian. vel Capivi.* till it is well closed, and out of Danger, nor liable to a fresh Hæmorrhage. If you come to your Patient, and find his Arm bleeding, the Trunk of the brachial Artery must be immediately compressed, either by the Tourniquet, or with the Thumb and Fingers of an Assistant fixed about the Middle of the Arm: And having provided more or thicker Compresses, and a longer Bandage, you then take off the old Dressings, wash clean the Wound with warm Wine, or its Spirit, and next proceed to renew your Deligation more carefully, as we before directed. If the Surgeon meets with the Appearance of a Gangrene from too great a Stricture of the Bandage, he must unbind and foment the Arm, or treat it with the

Re-

Remedies proper for that Case, and, augmenting the Number of his Compresses, re-apply his Bandage more closely than before. But if the Gangrene proceeds from a Loss of the Circulation through the Limb, by a Defect of the other arterial Trunk of the Arm, which seldom happens, in that Case you must amputate without delay.

V. If the Surgeon meets with none of the forementioned Symptoms, for some time after his Deligation, he must order the Patient to keep on the Bandage for a Week or a Fortnight longer, keeping his Arm, in the mean time, free from Exercise or Motion: Lest the Blood should, by that Means, force and extend the as yet tender *Cicatrix* into an Aneurism. His Diet must also be all along spare and light, as at the beginning; strictly avoiding all Wines and fermented Liquors, and every thing that will put the Blood into a violent Commotion: In which last Case the Surgeon will find it necessary to bleed in another Part. Thus you may avoid all Danger of an Hæmorrhage, or an Aneurism; and the Patient's Arm will become as well as ever, especially, if the Wound be dressed with a little *Bals. Peruv. vel Capiv. &c.*

The Patient's Regimen.

VI. Thus far have we described the Method, in which the Surgeon must proceed, when the Error is not discovered by the Patient, or his Attendants. But if either of them have smelt out the true Case, it will be the best Way for him to make a free Acknowledgment of his Mistake or Accident, excusing the same, by assuring them, it is no more than what may happen to the most expert Surgeon living, in opening some Veins: And then promising the Patient, that if his Directions are observed, he shall be perfectly cured, without any Damage: And thus he may compleat his Cure, perhaps better than if his Patient knew nothing of the Matter: For knowing the Case to be so much more dangerous than that of an incised Vein, the Patient will be more submissive, and the Surgeon's Orders more punctually observed.

What must be done if the Error is detected.

VII. When the Aperture of the Artery, and that of the Integuments, do not exactly correspond with each other, but the Blood being forced out of the Artery, insinuates itself betwixt the Flesh and Skin; in that Case, which very often happens, the Patient must not be bled *ad Deliquium*: For even after that, there may be so much Blood extravasated and retained betwixt the Integuments and Muscles, as may cause a Mortification of the Arm by its Putrification, or at least may render the Operation for an Aneurism absolutely necessary to be performed. If therefore the Surgeon cannot draw back the Orifice or Incision of the Integuments, so as to make it correspond with that of the Artery, and discharge the retained extravasated Blood, he ought immediately to compress the Wound with a Lump of chewed Paper, and several Compresses, each larger than the other, which are all to be firmly secured on the Part by the Bandage or Deligation before described at Sect. II. of this Chapter; not forgetting the long Compress and Bandage, which we recommended for compressing the brachial Artery. Then, after bleeding plentifully several Times, in some other Part, the Remainder of the Treatment may be according to Sect. III, IV, V, and VI. preceding. But the Patient must be visited again in a little Time, to inspect the Arm: For it often happens, that when you have no apparent Bleeding after Deligation, yet the Blood will insinuate itself betwixt the Muscles and Integuments, so as to distend the Arm to an enormous Size. A remarkable Instance

Treatment when the Blood insinuates betwixt the Flesh and Integuments.

stance of this DIONIS^a gives from his own Practice. He was once obliged, in this Case, to incise the Integuments of the whole Arm, whereby he discharged four Pounds of Blood, that had been equally dispersed all round, from the Elbow to the Shoulder. And we also meet with a similar Observation in RUYSCH^b, in which concremented Blood was lodged almost all over the Arm. You may also consult BARTHOLIN. *Epist. Med.* 53. Cent. III. *Hist. Anatom.* IX. Cent. II. and his History of an Aneurism dissected, which he saw at Naples, *An.* 1644.

C H A P. XIII.

Of ANEURISMS.

What an
Aneurism is.

I. **A** Throbbing Tumor, distended with Blood, and formed by a Dilatation, Wound, or Rupture of an Artery, is by Surgeons usually denominated an *Aneurism*: Of which they distinguish two Kinds, the *true*, and the *spurious*. A true Aneurism has always a Pulsation, more or less, and is formed by a Dilatation only of the Artery, either all around^c, or on one Side of it, much in the same Manner as those analogous Tumors of the Veins are formed, which we term *Varices*. So that both Aneurisms and Varices are a Kind of *Hernia Arteriarum & Venarum*. But the spurious Aneurism, is, when the Artery being opened by a Puncture, Wound, Contusion, Erosion, or other external Violence, extravasates the Blood betwixt the Muscles and Integuments, the Limb itself appearing livid, and much swelled thereby. A true Aneurism may also degenerate into one that is spurious, by a gradual Dilatation of the Artery, and Extenuation of its Coats, till at length being totally ruptured, the Blood is either extravasated and retained under the Integuments, or discharged freely from the Wound. Hence the Tumor is much larger and less prominent, or pointed in the spurious, than in the true Aneurism, and is also attended with little or no sensible Pulsation: But the Putrefaction of the extravasated Blood very often occasions a Gangrene and Mortification of the Part, or even Death itself, by a profuse Hæmorrhage. But Aneurisms may be again distinguished from their Circumstances and Symptoms, into *simple* and *complicated*. The first are formed without any ill Accidents: The last are usually attended with Immobility, violent Pain, an Abscess or Sphacelation of the Part, &c. which

^a *Chirurg. Operat. Demonstrat.* VIII. Chap. of Aneurisms.

^b *Obs. Anat. Chirurg. Obs.*

2. pag. 7.

^c 'Tis a little extraordinary that the learned Dr. FREIND should, in his History of Physic, contend that all Aneurisms are formed by a Rupture of the Artery; when we have so many Instances of their arising from a Dilatation only of the arterial Coats, either on one or all Sides. See that described by me in *Annal. Acad. Julæ Semestri* XII, p. 81. Those in PAREY's Surgery, and RUYSCHII, *Obs. Chirurg. & Hist. Acad. Reg. An.* 1712 & 1721. Also LANCISI *Lib. de Corde & Aneurismat. & Lib. de Mortib. Subitan. in Schol. Obs.* 5. § II.

more usually accompany the spurious Aneurism^a. Aneurisms may be also distinguished, from the Situation of the Arteries, into *external* and *internal*^b, the first being accessible, the others not. Another remarkable Difference of them may be taken from their having either a violent or else but little or no sensible Pulsation^c. For it is to be observed, as we before mentioned, that spurious Aneurisms seldom have any considerable Pulsation, especially when they are large; whereas the true Aneurisms, especially the small, have a very strong and sensible Pulsation: But in some of them the Pulsation increases, and in others it diminishes, as the Tumor enlarges. See my Account in *Annal. Acad. Julæ Semestri XII. pag. 81.*

II. In a true and external Aneurism, besides the forementioned Signs, we *Diagnosis* observe a small Tumor at the Beginning, no larger than a Filbert, which has always a Pulsation. (As for the internal Species, as they lie concealed from our Senses, little or nothing can be said of their Signs, with which, however, the Reader may be supplied in LANCISI's Treatise on the Subject.) The Tumor generally feels soft to the Fingers, with a Sort of Fluctuation and Resistance of a Fluid, and is almost constantly of the same Colour with the Skin, having a Pulsation like that of the Artery to which it belongs. Upon pressing the Finger on the Tumor, as yet small, it disappears: And upon removing the Finger it returns instantly again. But the spurious Aneurism appears livid, feels hard and turgid, with intense Pains: The Tumor is here more plain or equal, and generally without Pulsation, as upon pressing it affords a Sort of rumbling or fluctuating Noise; and distending the whole Limb, or a great Part thereof, to an unusual Size^d, it very often either degenerates into an Abscess or a *Sphacelus*.

III. Aneurisms most frequently arise in the brachial Artery, from an erroneous Puncture or Injury thereof, in bleeding in the Arm, especially in the Basilic Vein. For the Artery being in a constant Pulsation, will, by urging its Blood against the arterial Coats, gradually distend them where they make too little Resistance, so as at length to form a considerable Tumor. If therefore a throbbing or beating Tumor like that described in the foregoing Paragraph should appear in the Arm a few Days or Weeks after bleeding, it may be certainly depended upon to be an Aneurism. But the Origin of Aneurisms is not from the Lancet alone; nor is their Seat restrained to the Arm only^e; for

The Seats
and Causes
of Aneurisms.

^a A remarkable Aneurism of the spurious Kind is described by BARTHOLIN in a professed Dissertation, entitled, *Aneurismatis Difficili Historia*, Panormi 8^{vo}. 1644. See also VAN HORNE in *Epist. de Aneurismate*; and LANCISIUS, *Lib. de Cord. & Aneurism.*

^b Histories of internal Aneurisms may be seen in PAREY, *Book VII. Chap. 32.* MONS. BLEGNI, *Zodiac. Med. Gallic. An. 1681, p. 44.* RUYSCH. *Obs. Chirurg. 37.* LANCISIUS. *Et Annal. Acad. Julæ locat.*

^c Of which I have made many Observations besides those in PAREY, *loc. cit.* RUYSCH. *Obs. 38.* BLEGNI, *l. c. p. 25. & 42.* NUCK *Operat. Chirurg. Exper. XXIX.* LANCISIUS, *l. c.*

^d The spurious Aneurism often acquires an enormous Size, but the true one hardly ever exceeds the Bulk of a Chestnut, according to GOUVEY, *Chirurg. pag. 231.* But that his Opinion is not to be absolutely depended on, may appear from the several Accounts we have of larger Aneurisms, particularly one the Size of a Goose Egg in HILDANUS, *Obs. 44. Cent. III.* PURMANNUS *Chirurg. curiosa, p. 212.* And in our *Tab. XI. Fig. 6.*

^e AMB. PAREY, *Lib. IV. Cap. 32.* asserts the Neck to be the Part in which Aneurisms are most frequently formed; but his Opinion is not countenanced by our latter Experience and Observations.

they may arise from an infinite Number of Causes, both external and internal, and may be formed in all Parts where there are any arterial Trunks, or considerable Branches distributed. Thus we often meet with them from a Wound, Contusion^a, and Suppuration, and from external Injuries in most Parts of the Body. But internally they may arise either in the Thorax or Abdomen, from a Diminution of the Strength and Resistance of the external or internal Coats of the large arterial Trunks, from various Causes, as an Ulceration, Erosion, &c. agreeable to the Observations of FALLOPIUS, (*Lib. de Tumor. Cap. 14.*) SEVERINUS (*Lib. de Abscessibus*) RUYSCH *Obs.* 37. & 38. LANCISI (*Lib. de Cord. & Aneurismat.*) and our Observations in *Annal. Acad. Julise Semestri XII.* p. 81. We must however confess, that the Causes of internal Aneurisms are often very doubtful and unsettled: Notwithstanding which, we ought to distinguish those Causes as they occur, into external and internal. They often proceed from a Blow, Fall, or a Fracture of the adjacent Bone, or a violent Straining in lifting great Weights, Jumping, Riding on Horseback, &c. whereby the Blood is accumulated and urged so forcibly in the Artery injured, as gradually to distend its Coats, and form a Tumor. Sometimes they are owing to an Inflammation, Suppuration, Erosion, or Ulcer in some neighbouring Part, or in a Part of the Artery itself: By which the other Coats are so weakened, that they are unable to support the Impetus of the Blood. Hence they give way, expand themselves, and swell. In the same manner too we often meet with Aneurisms from a slight Puncture, or even barely touching the Coats of an Artery with a Lancet in opening a Vein: In which Case the exterior Coat of the Artery being divided, and the interior remaining entire, the latter is not alone strong enough to resist the Impulse of the Blood, but gives way insensibly at each Ictus of the Artery, till it at length forms that considerable Tumor which we call an *Aneurism*. If we therefore consider that the mechanical Formation of Aneurisms is in this Manner from a diminished Resistance in the arterial Coats, we shall find the Causes thereof very numerous, which may weaken an Artery more in one Part than another; so as to make it give way to the Force of the Heart, or Impulse of the Blood, and form an Aneurism. And this especially, when several Causes concur together, as if violent straining or leaping, &c. be used when the Coats of the Artery are previously extenuated or weakened by a Contusion, Inflammation, Suppuration, &c.

Diagnosis
of injured
Arteries.

IV. I think we have in the preceding Chapter sufficiently explained the Manner of enquiring into the greater Injuries and Wounds of the Arteries, that may happen in opening a Vein. We shall here only enumerate the Signs by which we may discover slight Punctures, or the smaller Injuries of them, which occur in Phlebotomy. But as we are not supplied with any certain or characteristic Signs indicating such slight Accidents, we must make the best Use of a reasonable Conjecture. If therefore you should perceive a Pulsation against the Point of your Lancet, notwithstanding you have no Hæmorrhage from the Artery, yet you may reasonably conclude that the external Coat of that Vessel must be in some Degree injured thereby: And therefore it will be proper to

^a Thus FEHRIUS has observed an Aneurism in a Lad, from a Blow on the Left Side of his Head, which, in the Space of eight Days, enlarged so as to cover half his Head. V. BARTHOLIN, *Epist.* 53. Cent. III.

make your Deligation and Compression to prevent an Aneurism, in the Manner we before directed in the preceding Chapter.

V. But if a small beating Tumor should be formed within the Space of a *Prognosis*. Month after Phlebotomy, either through the Neglect of the Surgeon or Patient, or from leaving off the Deligation too early, it may be pretty safely depended on to be one of these Aneurisms from a slight Cause. But if it be a true Aneurism, whilst it continues recent and small, it gives little or no Uneasiness, besides its Tumor and Pulsation: Yet when it has afterwards gradually acquired the Size of an Egg, or one's Fist, or even the Bulk of one's Head, as may be seen in PURMANNUS *Chirurg. Curios.* p. 612. and in our *Tab. XI. Fig. 6.* it then occasions intense Pains, Weakness, Immobility, and other bad Symptoms in the affected Limb. If then the Help of the Surgeon be not speedily called in, the arterial Coats becoming gradually extenuated, will at length burst, and be followed by a Train of the worst Consequences, if not the Death of the Patient. If the external Integuments should be broke through, a fatal Hæmorrhage must follow: And even if they should continue intire, an Abscess or Gangrene would destroy the Part, as I myself have observed here in a Patient at *Helmstadt*. See also RUYSCH, *Obs.* 2. Though the Generality of Aneurisms afford a dangerous Prognosis, a^a BARTHOLIN and b HARDER observe, yet none are so much to be feared as those which are formed internally in the larger arterial Trunks, where there cannot be had a free Access to the Parts, as in the *Aorta*, *Subclavian*, beginning of the axillary, brachial, and carotid Arteries^c, &c. Those Aneurisms too are generally incurable which are formed in the carotid Arteries of the Neck, in the Subclavian or Axillary near the Shoulder, and in the crural Artery, especially if near the Abdomen. For if the Operation be performed on any of these, it must be followed either with a profuse or fatal Hæmorrhage, or else a Mortification of the Parts. But those Aneurisms are much less dangerous, and frequently admit of a Cure which are formed in the external Branches of the Arteries, especially in those running on the *Cranium*, or without the Ribs, and those in the Foot, Hand, or lower Arm. Yet if the Aneurism be not recent, though even in the Arm, the Success of the Operation by the Knife will be at least very uncertain, when Deligation and Compression alone will not take their due Effect. For as the arterial Trunk must necessarily be closed or shut, it will be almost next to impossible to prevent the Parts, to which the Artery was distributed, from wasting away, or else from mortifying: Since the Circulation of the Blood, and their Supplies of Nourishment are by this means in a great Measure, if not totally, cut off; the lateral small Branches of Arteries being incapable of importing a due Quantity of Blood to the Hand and Parts of the *Cubitus*, when one of the larger Branches is wanting^d. This is therefore a frequent Cause of a Mortification in them, so as often to oblige the

^a See BARTHOLIN. *Epist. Med. Cent. III. Epist.* 53. ^b JO. JAC. HARDER, in *Apic. Obs.* 86.

^c LE DRAN, *Obs.* 40. T. I. relates, that he has found frequent Venesection of great Service in an Aneurism of the *Aorta*: I have experienced the same.

^d That the fellow arterial Branch of the *Cubitus* is not so often absent as Surgeons have imagined, is made apparent, with other just Anatomical and Chirurgial Observations, in a Medical Dissertation or Thesis had under me at *Helmstadt*, by Dr. MOEBIUS, *An.* 1730. the Substance of which I think to communicate in my Observations, which I intend to publish some time hence by themselves.

Surgeon to an Amputation, as hath been frequently experienced by myself and others^a; and even Amputation itself will very often not save the Patient, as may appear from the Case in BARTHOLIN, *Epist.* 53. *Cent.* When an Aneurism bursts spontaneously, the Hæmorrhage is generally so profuse, that the Patient's Life may be lost^b in a Minute's Time, if a speedy Compression be not made on the Artery by a strict Ligature, or the Tourniquet, and the Assistance of an expert Surgeon. And extremely dangerous is the Case when the Surgeon, by Neglect or Mistake, incises one of these large Tumors instead of an Abscess, as hath been sometimes done^c. Yet it ought to be observed here, that spurious Aneurisms are in the general much more dangerous than the true ones. True Aneurisms are sometimes tolerable without any great Danger or Uneasiness for many Years^d, or as long as the Patient lives; especially if they are defended and secured with proper Bandage and Compresses: Whereas on the contrary, spurious Aneurisms will not continue many Days without inducing an Hæmorrhage, Abscess, and Mortification in the Parts. But both the true and spurious Species of Aneurism are always the more dangerous and troublesome as they are larger: Infomuch, that their Size has deterred the expert and intrepid HILDANUS^e from performing the Operation on them. And RUYSCH openly declares^f, that, in the vast City of *Amsterdam*, no Surgeon had undertaken to perform the Operation for above twenty Years before him. The spurious Aneurism is also more difficult to cure even by the Knife than the true Species: Because the Blood which is extravasated and concreted all around gives the Surgeon immense Trouble to discharge it. As for internal Aneurisms, they not only lie concealed from our Senses, but are also absolutely destitute of any Help or Remedy from Art, because they are inaccessible to the Hand. But were an internal Aneurism to extend and shew itself externally, it could not be well subjected to the Operation, without greatly hazarding the Patient's Life: And therefore the Cure of such have been prudently refused by the most eminent Surgeons, as FALLOPIUS, PAREY, SEVERINUS, &c. cited in BARTHOLIN's *Historia Aneurismatis Disserti*. And for the same Reason we here restrain our Doctrine and Treatment of this Disorder to the external Species of Aneurisms only. But they who desire a more particular Account of the Internal, may consult the learned Treatise on the Subject by LANCISI.

Treatment
of slight
Aneurisms.

VI. I shall now, for the Information of the younger Surgeon, describe the Method of treating an incipient Aneurism, forming itself in the Flexure of the *Cubitus*, or Bending of the Arm, where this Disorder more frequently occurs than in any other Part: And from hence, I think, he may easily judge of the Method in which other less frequent Aneurisms are to be treated. Whenever a small Aneurism of the true Species begins to form, and shew itself at the Flexure of the Arm, you are furnished with two Methods of relieving it, either by Deligation, or by Incision. The first of which may be again performed

^a V. RUYSCH, *Obs.* 2. BARTHOLIN. *Epist.* & VAN HORN *de Aneurismate*.

^b V. *Phil. Transact.* N^o 402. *Act. Erud. Lips.* Tom. III. pag. 401. PAREY, *Lib.* VI. *Cap.* 32.

^c V. PAREY, *Lib.* VI. *Cap.* 32. HILDANUS, *Cent.* III. *Obs.* 43. RUYSCHII, *Obs.* 38. VAN HORN & LANCISI, *loc. cit.*

^d Thus SENNERTUS (*Prax. Med. Lib.* V. *Part* I.) gives the Case of a Woman who sustained an Aneurism the Size of a Walnut on the Flexure of the *Cubitus*, without any Detriment, for the Space of thirty Years.

^e *Cent.* III, *Obs.* 44.

^f *Obs. Chirurg.* 2.

either.

either by Compress and Bandage, or by an Instrument adapted for the Purpose. The Method of relieving and curing this Disorder by Deligation and Compression, if there be no Extravasation, ought always to be tried before that by Incision, as well in the incipient true as in the spurious Aneurism: For it would be barbarous to subject the Patient to a cruel Operation, for what may be remedied by a milder Treatment. The Patient may be therefore relieved, and the Tumor diminished by Compression, after discharging the extravasated Blood, either with a Compress of chewed Paper, or a bit of astringent Plaster, retained with the other Compresses and Bandage we described in the preceding Chapter. By which Means the Disorder may be considerably diminished, if the Deligation be continued on the Limb for several Weeks or Months: And thus we read of Cures performed as well formerly by HILDANUS (*Cent. III. Obs. 44.*) TULPIUS (*Obs. Med. Lib. IV. Cap. 17.*) ROGERUS, (*Zod. Med. Gall. 1681. p. 43.*) and others of the last, as well as of the present Century. But if Deligation be found insufficient, as it was upon the French King's Physician, M. BOURDELOT (*Zod. Med. loc. cit.*) Recourse must then be had to a particular Machine adapted to the Purpose of compressing the Aneurism; which if small, may, by the Assistance of that Instrument and a strengthening Plaster, be compleatly cured. Among the several Instruments contrived for this Purpose, we have selected the two represented in *Tab. IX. Fig. 8 and 9.* the Use and Application of which may be better understood from Inspection, than a verbal Description. We have also, in my Opinion, sufficiently explained it in our Exposition of *Tab. XI^a.*

VII. If the Aneurism is too large to receive any Benefit from Compression by Deligation, or the preceding Instrument; or, if a true Aneurism should, by a Rupture of the arterial Coats, degenerate into a spurious one, attended with a livid Tumor from the extravasated Blood, Immobility of the Arm, intense Pain, and the Danger threatened from an accidental or profuse Hæmorrhage; in that Case the Patient can have no Relief, but from the Operation by the Knife. Which Operation, however, being attended with much Pain and Danger, ought not to be undertaken without great Care and Circumspection, and with the Approbation or Advice of other eminent Physicians and Surgeons: Lest, if the Success thereof should turn out worse than expected, it might be rashly attributed to Imprudence or Misconduct in the Operator.

VIII. There are chiefly two Things required in the Operation: First, a Removal of the Tumor or Aneurism; and then to conjoin or heal up the Wound in the Artery. In the last Century they used to amputate the Arm for an Aneurism in Italy, and then applied an actual Cautery to the divided Artery, as we are told by BARTHOLIN, in his *Histor. Aneurismat.* But at present we endeavour to preserve the Patient's Arm, and remove the Aneurism by a much milder Treatment. For the successful Performance of this Operation, the Surgeon must attend chiefly to three Things: First, to stop the Flux of Blood through

Treatment
of large
Aneurisms.

What is re-
quired in the
Operation.

^a SCULTETUS also describes and figures an Instrument for this Purpose, in his *Armament. Chirurg. Edit. 4^{to}, Anno 1666. Tab. XIX. Fig. 4.* But his does not seem so well adapted as ours. DIONIS likewise mentions the Instrument contrived and used by Dr. BOURDELOT (described at large in BLEGNI's *Zod. Med. Gallic. 1681. pag. 43.*) for himself, by which Ponton or Bridge, he relates, that, within the Space of a Year, he was cured of an Aneurism in his Arm, as big as a Pullet's Egg.

the Artery by the Tourniquet, an Instrument unknown to the Antients: Secondly, to denudate the Artery, and free it from the adjacent Integuments; and, lastly, to contract or constringe the same, either by Medicines or Ligature^a. It will therefore first be necessary to have all the proper Instruments conveniently disposed in Readiness in a large Plate or Dish, that there may be no Delays in the Operation. This *Apparatus* must take in a *Tourniquet*, to compress the brachial Artery, (see *Part I. Book I. Chap. II. Sect. IX. and X. & seq. ad XV.*) a *Scalpel*, *Tab. I. G.* and a *Hook*, *Tab. VIII. Fig. 2. and 3.* to denudate the Artery: To which add a Sponge with some warm Wine, or its Spirit, a Pair of obtuse pointed Scissors, *Tab. I. C, or D.* some scraped Lint, square Compresses of several Sizes, one narrow Compress of a Span in length, with two large Pieces of Linen to invest the Arm: And, lastly, two or three Rollers of two Fingers breadth, and thrice as long as for Phlebotomy in the Arm. But if the Artery is to be contracted by Astringents or Caustics, the Success of which is very dubious and uncertain, you must then enlarge your *Apparatus* with some *Vitriolum Romanum*, *Butyrum Antimonii*, &c. Or if you secure the Artery by Ligature, which is the safest and universal Practice of the Moderns (because the Echar made by Caustics has been often observed to give way, and excite a fatal Hæmorrhage) instead of Astringents or Caustics, you must then provide a crooked Needle armed with some strong waxed Thread, twice or thrice doubled; or, instead of a Ligature, by a Needle and Thread, you may apply the particular Instrument invented by me for this Purpose, and represented in *Tab. VIII. Fig. 4.*

How the Patient and Assistants are to be disposed.

IX. Your *Apparatus* being prepared, the Patient is next to be seated in a Chair, leaning back with his Arm extended, in the same Manner as for Phlebotomy. Then you must place four Assistants round him, in the most advantageous Position: And when the Aneurism is in the Right Arm, it is, in my Opinion, best for the Surgeon to stand on the Right Side of the Patient, placing the most expert of the Assistants next him, to hold the disordered Arm above the Tumor, together with the Tourniquet applied to it; that he may increase or diminish the Stricture on the Arm by that Instrument, as the Surgeon shall direct. One of the other Assistants standing before the Patient, is to hold the Arm fast by the *Carpus*, that he may not flinch, or withdraw it in the Operation. A third Assistant is to stand on the Left Side, holding the *Apparatus* of Instruments. The fourth, or last Assistant, must be ready to do any thing the Surgeon may find necessary to direct him, during the Operation. But if the Aneurism is in the Left Arm, the Surgeon and Assistants are to be disposed in the reverse Order, as any one may easily direct.

Application of the Tourniquet.

X. The first Part of the Operation consists in applying the Tourniquet about the Middle or upper Part of the *Humerus*, so as thereby gradually to compress the brachial Artery, (see *Tab. III. Fig. 1. K*) till you can perceive no Pulsation either in the Artery at the *Carpus*, or in the Aneurism itself. By which means you will be sure to avoid any considerable Hæmorrhage: But you must be careful to moderate your Stricture by the Tourniquet, so as not to injure the Nerves, or other sensible Parts. The Stick, by which the Tourniquet is twisted,

^a Surgeons formerly closed the Artery, by cauterizing with a red-hot Iron; but that is a Method too cruel, and is, at the same time, not secure, and often has pernicious Effects.

must be held by an Assistant on the Right Side; or if you use the Screw Tourniquet, represented in *Tab. V.* and *VI.* that will remain fast on the Arm, without holding. But it sometimes happens, as GARENGEOT observes in his Surgery, *Chap.* on Aneurisms, that the Tourniquet cannot be safely applied to the Arm in a spurious Aneurism, by reason of the great Extravasation and Tumor. In that Case you may therefore, as the Author directs, apply the Tourniquet over a Ball and Compress in the *Axilla*, so as to compress the Artery, by twisting the Stick of the Tourniquet above upon the Shoulder.

XI. When the Tourniquet is properly fixed and tightened upon the Arm, there are then three Methods of performing the Operation. The first of these is, by laying open the true Aneurism by a longitudinal Incision, continued upward and downward by the Scalpel, according to the length of the compressed Artery: Which done, you are to remove the vitiated Blood or Matter therein lodged, either by your Fingers, the Probe, or a Sponge. The Parts being thus cleansed, you must, in the next Place, slacken the Tourniquet a little, that the salient Blood may demonstrate the upper Orifice of the Artery to you. And in doing this, you need not constrict your Tourniquet again immediately, if the Patient be strong, and of a full Habit: But rather permit the Artery to discharge a few Ounces of Blood, more or less, as may be thought proper. When you have again tightened your Tourniquet, so as to exclude the least Hæmorrhage, if your Intention is to treat the Disorder by Caustics and Styptics, you must insert a bit of blue Vitriol, wrapt up in Cotton or Lint, into the upper Orifice of the Artery; securing it there by several small Compresses, each a little larger than the other, and filling up the rest of the Space on all Sides with rude Bundles of Lint. You must then make a strict Bandage, after pressing it close with the Fingers and Thumb of your Left Hand, over the affected Artery of the disordered Arm. Instead of intruding a Piece of Vitriol into the Orifice of the Artery, you may apply a Dossil of Lint dipped in, and expressed out of the Styptic Liquor of WEBERUS, or in Butter of Antimony: The Effect of which, being secured with Compresses and Lint as before, will be equal to, if not better than the first we proposed. Over the Dressings must be applied a square Plaster, and a large Compress of the same Form, to be closely retained by a Bandage, three or four Times as long as is commonly used for Phlebotomy in the Arm. M. DIONIS makes his Deligation without the Piece of Vitriol, for which he substitutes a Lump or two of chewed Paper, or Lint, dipt in some Styptic, which he covers with several small Compresses, each larger than the other, and secures the whole upon the incised Artery by Deligation: Which Method of dressing may, in many Cases, be convenient and proper enough.

XII. But in order the more effectually to prevent a future Hæmorrhage, it will be necessary to apply another Bandage over the former: And, after making some circular Rounds with it upon the Part affected, it is to ascend up the Arm upon the long Compress imposed on the brachial Artery on the Inside of the Arm, as we directed in the preceding Chapter. That this last Bandage may adhere more firmly, it will be necessary to pass it round the *Thorax*, when arrived to the Shoulder, and to fasten it off upon the Arm, disposing the Patient to rest. When your Dressings are thus compleated, and the Tourniquet a little loosened, you must observe whether any Blood issue through the Bandage:

First Method
of Opera-
ting.

Treatment
after Deli-
gation.

dage: And if there be no Appearance of any, it is a Sign your Operation is well performed.

Procedure in
Case of an
Hæmor-
rhage.

XIII. But if you perceive any Blood ooze through the Dressings, the Artery must be again compressed by the Tourniquet, your Dressings taken off, and re-applied with more Care and Exactness: Or else a more certain Method must be taken to secure the End of the Artery, by Ligature, with a crooked Needle and a double waxed Thread, which is the only infallible Means of defending the Patient from a fatal Hæmorrhage, and was formerly proposed by PAULUS AEGINETA^a, one of the most antient among the *Greek* Physicians. But in making this Ligature, the Surgeon must have a principal Regard to two Things: He must avoid injuring both the Artery itself and the adjacent Nerve. In order to which, it will be most convenient to make your external Incision through the Integuments sufficiently large, and then carefully to separate the Nerve from the Artery, to which it is attached, by a small Hook: And then to pass the Head, or obtuse End of the Needle, foremost under the Artery, till you can take hold of the Thread, that its Point may not hurt either that Vessel or the Nerve. Or else, instead of a Needle, you may pass your Ligature under the Artery, by the Instrument which I contrived for that Purpose in *Tab. VIII. Fig. 4. C.* This Instrument is to be withdrawn when your Ligature is opened and drawn a sufficient Length from under the Artery, which is then to be tied with it upon a thin Compress of scraped Lint, with which you are to defend or invest the Artery before the Constriction of your Ligature. The Artery being thus securely tied up, you leave about a Hand's Breadth of the Thread or Ligature hanging out of the Wound: In which Manner it is to continue till the Artery is closed, and the Ligature comes off spontaneously. There are some Surgeons who also direct the lower Orifice of the incised Artery to be secured by a Ligature as well as the Upper: And there are others again who think the same to be useless, or even mischievous, as indeed it may be, when the Disorder being in the Flexure of the Arm, the larger Incision and Cicatrix this Way made, will, in some Measure, impede or stiffen the Motion of the Joint. But if the Aneurism be not in the Joint, or in the lower Part of the *Cubitus*, and you perceive Blood to issue from the lower Orifice of the divided Artery, then you may, and even ought to make a second Ligature below, as well as above. And thus, after I had tied the upper Orifice in an Aneurism of the cubital Artery, upon relaxing the Tourniquet, I perceived Blood start from the lower Orifice, which I therefore secured like the other, by tying it with a crooked Needle and strong Thread: So that by their Assistance, with the Application of Balsams, I happily cured the Patient, though a little before in very great Danger of Death. In the same Manner you must also make a Ligature both above and below, even in the Flexure of the *Cubitus*, if you thus find it necessary; or at least you must compress the lower Orifice of the Artery by a proper Bandage and Compresses: in which Method I once accomplished

^a *Lib. VI. de Re Medica, Cap. XXXVII.* where he says, If a Tumor or Aneurism is formed from an Injury of the Artery, we make a longitudinal Incision through the Integuments: And dilating the Lips of the Wound by Hooks, we denude the Artery, under which we pass a Needle and double Thread, tying it above and below. The intervening Part of the Artery betwixt the Ligatures we lay open by Incision, and after discharging the Contents, we suppurate till the Ligatures are digested off.

my Cure of this Disorder, without making a Ligature below. When the Artery has been thus secured by Ligatures, it is a common Practice with some Surgeons to divide it transversely a little beneath the Ligature; that the contracting or receding of the Artery into the Flesh may compress its Extremities, and the better prevent a consequent or dangerous Hæmorrhage. But in my Opinion that Practice is improper, or at least it is unnecessary; as I have twice successfully performed this Operation, and happily cured the Patients of their Aneurisms without thus dividing the Artery. Lastly, you are to fill the Wound well with scraped Lint, to be firmly secured by Compresses and a strict Bandage, as we before directed, and as we shall more largely explain and demonstrate in our third and last Part of Surgery or Bandages.

XIV. In the next Place it is a common and no improper Practice with some Surgeons to guard against an Inflammation by laying Linen Compresses dipped in Oxycrate, on each Side the affected Parts of the Arm, to be retained by a spiral Bandage; and then to bleed the Patient in another Part: Which may be very necessary Precautions in Patients of a warm and full Habit. But Phlebotomy with those cooling Applications will be pernicious in such as are of a cold Constitution, and have before lost much Blood in the Operation or otherwise; notwithstanding the *French* recommend that Treatment to be generally followed without any Restriction. For I have myself cured several in which I not only omitted Bleeding and the Oxycrate, but even used warm Applications of *Sp. Vini Calid. Camphorat. cum Theriaca*. Your Deligation or Dressing being thus completed, the Patient is to be put to Bed, and his Arm laid in an easy or a little inflected Posture upon a Pillow, and the Patient is to be ordered at the same time to move himself as little as possible, in order to restrain the Impulse of the Blood from the Heart on the affected Artery. If you should perceive the Arm to swell violently, and threaten an Inflammation, lest it should be occasioned by too great a Stricture of your Bandage, you must take it off and apply it again as we directed at N. XII. preceding. But for a small Tumor or other slight Symptoms you should not hastily remove your Bandage, for fear of a profuse Hæmorrhage: Especially as Experience teaches that even a livid Swelling of the Arm may be sustained in these Cases without any bad Consequence, provided the Swelling be not over painful or tense, nor infested with any of the Symptoms of a Gangrene: Under which Circumstances we have directed you to a Method in the preceding Chapter.

XV. But in order to prevent a fatal Hæmorrhage, when the Cure of an Aneurism is attempted by Astringents or Caustics only, without making a Ligature on the Artery, it may be proper for an Assistant constantly to attend and lie by the Patient, provided with a Tourniquet and the Method of applying it to compress the Artery in Case of such an Accident, till the Surgeon can be called to make a Ligature on the Vessel by a crooked Needle and double Thread. But such an Accident is, in my Opinion, best prevented at first by taking up the End of the incised Artery with a Needle and Thread, rather than to trust to the Uncertainty of a Constriction or Eschar made by Caustics. 'Tis also a prudent Practice of some Surgeons to arm their Needle with three Threads; which being passed under the Artery, two of them are tied and the other left loose to be fastened afterwards by itself when the other Threads are relaxed, so as to permit a fresh Hæmorrhage.

Method of preventing an Inflammation.

How to prevent an Hæmorrhage.

XVI. With

Manage-
ment of the
Dressings.

XVI. With regard to the Bandage and Dressings, if they adhere firmly upon the Parts, they ought not to be removed on any slight Occasion, before the third or fourth Day; except a great Inflammation, Tumor, or Hæmorrhage should make it necessary to renew the same. Then the Surgeon must take Care that the Tourniquet be duly applied and fixed upon the Arm, or else the Artery compressed by the Fingers of an Assistant before he proceeds to take off the Bandage and Dressings: And even then he ought not violently to force off the Compresses if they adhere, which might bring on a profuse Hæmorrhage; rather let them remain. When he has cleansed the Wound as much as possible, he should fill it with fresh Lint saturated with some digestive Ointment, leaving such Parts as adhere to be spontaneously separated, in the succeeding Dressings. In this Disorder the Dressings ought to be repeated as seldom as possible, especially within the first fifteen Days; and then it should be made with all the necessary Cautions to prevent a Rupture of the Artery and a profuse Hæmorrhage.

Treatment
of Inflammation
Heats, Fevers, and other Symptoms.

XVII. If within a few Days after the Operation the Patient is seized with an Inflammation or Fever, from the intense Heat and increased Motion of the Blood, Threatning an Hæmorrhage or a Gangrene in the affected Arm, he must then be instantly bled in the other Arm. In the mean time a cooling Regimen and Medicines are to be used, and Phlebotomy again repeated in Proportion to the Patient's Habit and the Urgency of the Symptoms. The Diet should be light, spare, and cooling, consisting chiefly of small Broths and diluent Suppings; industriously avoiding all hard and stimulating or heating Food, as is usual in large Wounds and other Inflammations.

Agglutination
of the
Wound.

XVIII. When the Orifice of the Artery is closely consolidated or united, which in common Aneurisms usually succeeds in ten Days or a Fortnight's Time, your Business is then to agglutinate or heal up the external Wound in the Integuments, by treating it either with dry Lint or vulnerary Balsams: Observing in the mean time to make the Patient gently bend and extend his Arm at Intervals. Without this Precaution he may be troubled with an obstinate Rigidity or Stiffness of the Joint and an Incurvation of the Arm: Partly for want of attending and dispersing the Synovia, or Mucilage of the Joint, by repeated Motions; and partly from not stretching or extending the Cicatrix as it becomes gradually formed and more indurated.

PURMAN'S
Method of
operating.

XIX. Another Method for curing Aneurisms is, by fixing the Tournequet on the Arm, as we before directed: Then making an Incision through the Integuments, without touching the Aneurism, and having freed the disordered Artery from its Adhesions to the adjacent Nerves, it is then elevated by a Hook sufficient to pass a crooked and obtuse-pointed Needle under it, or our Instrument, *Tab. VIII. Fig. 4.* armed with a double-waxed Thread. By the tying of which Thread the Artery is constricted or closed; but in such a Manner that you must always place a small Compress of Lint upon the Artery under the Knot, lest it should cut or break through the Coats of that Vessel. The Artery being thus tied above and below the Aneurism, the Tumor is next laid open by Incision betwixt the two Ligatures, its Contents discharged, and the Wound then treated as we before directed in *N. XVI. & seq.* And this last is the Method PURMANNUS followed in the Cure of that large Aneurism which he mentions, *p. 212.* of his *Chirurgia curiosa*, compleating the Cure, and healing up the Wound within the Space of a Month. We have given the Figure of this monstrous large Aneurism in *Tab. IX. Fig. 6.* partly for its Uncommonness, and to illustrate

illustrate the Nature of the Disorder; and partly to refute the Opinion of GOUVEIUS^a, viz. That a true Aneurism never exceeds the Size of a Chestnut.

XX. The third and last Method of performing the Operation for the true Aneurism, is, by returning or pressing back the Blood out of the Aneurism into its corresponding Artery (which in large Aneurisms, where the Blood is very much concremented, is a thing impracticable^b) where this can be effected, the Tourniquet is applied to the Arm, and a longitudinal Incision made through the Integuments as before, without at all injuring the Aneurism itself by the Scalpel. This done, and the Artery freed from its Adhesions to the Nerve and Parts adjacent, it is then compressed by Ligature with a Needle and Thread as before; only without making any Incision in the Artery afterwards: By which means the Blood is prevented from returning into the Aneurism or distended Part of the Artery. You are then to treat the Wound with Digestives, as before, till the Ligatures and morbid Part of the Artery are cast off spontaneously; after which you may heal and cicatrize as we before directed. This is the Method by which ANELIUS^c happily cured a very dangerous Aneurism within the Space of a Month, at *Rome*. This he prefers, as one may hereby avoid the making a large Wound and Cicatrix, which are the constant Attendants of opening the Aneurism by Incision, and discharging its contained Blood, either by the Fingers or Instruments; which greatly protracts the Cure of the Disorder, as well as renders it more painful, and attended with a disagreeable and uneasy Scar. After the Operation is performed as above, ANELIUS bled the Patient four Times in the opposite Arm; and indeed repeated Phlebotomy is recommended by all the other *French* Surgeons who have treated on this Disorder. But though such repeated Bleeding may be of great Service in abating the Motion and *Impetus* of the Blood, in their warm Climate and Constitutions: Yet, in our more northern or colder Countries or Constitutions, I think it may be very well omitted; as it would too much weaken the Patient, and as I have happily cured several Aneurisms without it.

XXI. If, as I have sometimes observed, the Coats of the true Aneurism should burst spontaneously, so as to extravasate the Blood, it then degenerates into a spurious Aneurism, for which there is no Cure but by the Knife. Here therefore you must first of all apply the Tourniquet to compress the Artery and prevent an Hæmorrhage; you must then make an Incision through the Integuments sufficient to discharge what concremented Blood may have been extravasated and intercepted. Which done, and the Wound well cleansed, you must secure the Artery with a Needle and Thread, as in the true Aneurism; dressing and healing up the Wound as we have before largely directed.

XXII. Whenever you meet with the brachial, cubital, or tibial Artery, wounded either by a Dart, Sword, or other Instrument, so that the Hæmorrhage thence proceeding cannot be suppressed, either by Bandage or Remedies, there is then no Method of saving the Patient so certain and expeditious as this here proposed for Aneurisms. You ought first to apply the Tourniquet, then denude the Artery; and, if it be very small, to treat it with Caustics or Astringents:

^a See his *Chirurg.* pag. 23. 1.

^b And therefore when the Blood cannot be returned out of the Aneurism, this Method will not succeed, but one of the former must be used.

^c See ANELIUS's *Suite de la nouvelle Methode de guerir les Fistules lacrimales*, pag. 257.

gents: But if large, to secure it by Ligature with a Needle and Thread, as we before directed. For I may, without boasting, declare, many are the Patients that have, with my own Hand, been by this means as it were snatched from the Jaws of Death. I have even recovered those by Ligature, who have been almost spent and exhausted, so as to look like Death, through the fruitless Attempts of the Surgeons, continued for ten or twelve Days together by Styptics and tight Bandage, which had occasioned their Limbs to swell to an enormous Size. But whether or no this Method will succeed so as to save the Limb, in Wounds of the large crural Artery, I have never yet had an Opportunity of experiencing, nor did I ever hear or read of it attempted by others.

Aneurisms
in the Head,
Hands, and
Feet.

XXIII. In the Method we have here prescribed, you ought also to treat other Aneurisms, when they are curable: Which may be determined, partly from considering the Size and Situation of the Artery, and partly from the Size and Nature of the Aneurism itself. But, for the Sake of Beginners, I shall be a little more particular in my Account of other Aneurisms, and the rather, because it is a Subject of which most of our modern Surgeons take little or no Notice. And first, an Aneurism of the Artery betwixt the Thumb and Fore-finger, occasioned by a Puncture from a Penknife, was cured by Compression, as we are told by TULPIUS (*Lib. IV. Obs. 17.*) Which Compression he made by applying first, an astringent Plaster, over that a Plate of Lead, and then by a strict Bandage, having first returned the Blood out of the Tumor; the Disorder was cured within the Space of four Months. The same Treatment of Compression may be therefore used in most other Aneurisms, especially those which are recent, and not large, after having first returned or discharged the Blood contained in the Aneurism. A Woman struck her Son, of seven Years old, such a Blow on the Left Side of the Head with a Stick, that, by contusing the carotid Artery, a throbbing Tumor was instantly formed, about the Size of a Hazle Nut; which, in the Space of eight Days Time, grew so large as to cover half of his Head, from the sagittal Suture all over the Temple and Forehead to the Eye. Upon his coming for Advice, it was thought proper by the Surgeons to prefer the Operation, though a doubtless Remedy, rather than leave the Patient to the more certain Hazard of his Life. The Tumor was therefore laid open by the Scalpel, the contained Blood discharged, and the Wound dressed with Astringents and tight Bandage: By which means the Patient recovered in a short Time^a. Thus also was cured an Aneurism of the Artery behind the Ear, in Process of Time, though with much Difficulty, by the Use of Astringents and tight Bandage^b. If an Aneurism should arise near the Ankle, like that described by RUYSCH, *Obs. XXXVIII.* which was opened by an imprudent Operator for an Abscess, you ought either to make an Incision through the Integuments and Tumor, and to apply Astringents with a tight Bandage; or else to denude the Artery, and secure it by Ligature with a Needle and Thread, as we directed before. Hence you may be also able to treat Aneurisms formed in any of the other accessible Arteries of the Body, where there is any Prospect of obtaining a Cure. HARDERUS *Apiar. Obs. p. 325.* takes Notice of a Patient's sudden Death, from opening an Aneurism of a carotid Artery in the Neck: And

^a See BARTHOLIN. *Epist. Med.* 53. Cent. III.

^b *Ephemer. Nat. Curios.* Cent. III. *Obs. LXVI.* pag. 150.

VAN HORN has observed the same from an Apertion of an Aneurism in the Thigh.
Vid. Epist. de Aneurismate.

XXIV. They who desire a better Idea of the Manner in which the Ligatures are to be made upon the Artery for an Aneurism, may inspect *Fig. 7.* in our ninth Table, where A denotes that Part of the Artery above the Aneurism, B the Part below, C the Aneurism itself, D the superior Ligature, and E the inferior one. But here we may again observe, that when the Tumor is on the Flexure of the Arm, the lower Part of the Artery should not be tied with a Ligature, except it be absolutely necessary, for the Reasons we before alledged. But in what Manner the Circulation of the Blood is carried on through the Hand and lower Parts, after the Operation, I cannot conceive, especially when there is but one Trunk^a of the brachial Artery near the Elbow; as must have been the Case with the Patient of ANELIUS, because no Blood returned by the lower Part of the Artery, after its Division, into the Tumor, notwithstanding he did not secure it by Ligature. We must therefore defer our Inquiry on this Head, till some body may have an Opportunity of examining the Arm of a dead Subject who has undergone this Operation in his Life-time. Dr. WALTER HARRIS, in his Eighth Chirurgical Dissertation, openly condemns this Operation, and calls it dreadful and rash Butchery: But for what Reasons himself best knows. He seems, in my Opinion, to have been a very timorous Physician, who, out of Fear, or a foolish and ill-grounded Compassion, is for rejecting some of the most considerable and useful Operations in Surgery: Without which, it will be impossible for the Patient to obtain a Cure, or even to survive any Time.

Some Observations on the Disorder.

CHAP. XIV.

Of injecting Liquors into the VEINS, and of transfusing the Blood of one Animal into another.

I. **W**E treat next of *Injecting* and *Transfusing*, as a Branch of Surgery: Because those Operations require the Apertion of a Vein, in the same Manner as in Bleeding. The first is, the injecting some Liquor or Medicine into a Vein opened by Incision: And the last is, the conveying the arterial Blood of one Man, or Animal, into the Veins of another. Notwithstanding these Operations are seldom practised by our modern Surgeons, yet they were highly celebrated, and often performed, in the last Century, from the Year 1660 to 1680: And therefore we shall not think much of our Endeavours here, to give the young Surgeon a clear Notion of the Affair, from whence he may also be able to understand what Reasons gave Occasion for the first Invention and Perfor-

The Operations described.

^a I have often found two Trunks, or large Branches of this Artery, one situated in the inward, and one in the outward Part of the Arm; which below the Flexure of the *Cubitus* communicated again. But most Anatomists have described one only.—See my Dissertation on a dangerous Wound of the crural Artery.—Many Surgeons, unacquainted with this Particular in Anatomy, have taken off the Patient's Arm, where there was no Occasion, and often endangered his Life.

mance thereof; and what Advantages may be perhaps reasonably expected from the same Operations, even at this Time.

Uses expected from them.

II. The Generality of Physicians, not without Reason, attribute most Disorders of the Body to some Vice in the Blood. Therefore what Method can be more ready to remove or correct that Vice, than injecting a proper Medicine into the Veins to mix with the Blood itself, or the transfusing the sound Blood of one Man or Animal into the Veins of another, instead of that which is diseased. For by this means the Action of a Medicine on the Blood will be immediate and entire, without being impaired or changed by passing the Stomach and Intestines, and mixing with various Juices before it arrives to the Veins. But there are even many Cases which occur, wherein no Medicine at all can be taken by the Mouth, as in Apoplexies, Anginas, the *Hydrophobia*, &c. which may possibly be this way remedied, when they cannot by any other. And if plentiful Bleeding is so serviceable in many Disorders, as the Leprosy, Gout, Epilepsy, Apoplexy, Consumptions, Scorbutus, Venereal Disease, malignant Fevers, &c. by discharging the peccant Matter in the Blood, as it is by many Physicians allowed: Even the Objections of other Physicians against it, as weakening the Patient, &c. may, by these Operations, be obviated or removed. Even old Age may be supported, and the very worst Habits of Body corrected by these Means, so as to give a firm, juvenile, and healthy Constitution. These, and such like, are the vast Expectations which have been formed from the present Operations by Physicians: But the Misfortune is, that they not only meet with Disappointment in their good Views, but even frequently the Event turns out worse than the Disease. For almost all the Patients who have been this way treated, have degenerated into a Stupidity, Foolishness, or a raving or melancholy Madness, or else have been taken off with a sudden Death, either in or not long after the Operations. These lamentable and fatal Consequences have brought the Art of Injections and Transfusions into Neglect at the present: So that, being suspected and condemned by proper Judges at *Paris*, where they most flourished, we are told they were in a little Time prohibited by a public Edict of that Parliament.

The Art of Injection described.

III. Notwithstanding this, we shall give the young Surgeon an Idea of the Manner in which Liquors were formerly, and may now be injected into the Veins of living Men, or other Animals. And first, a Vein is to be opened, usually in the Arm, by your Lancet, as in Bleeding: And having introduced the small Pipe of a Syringe, or a very small Clyster-pipe with a Bladder (*Tab. XI. Fig. 10.*) the contained Liquor is injected or forced into the Vein upwards towards the Heart. Which done, you are to dress the Orifice, and make your Deligation upon the Arm in the same Manner as after Phlebotomy. But whether or no this Method of injecting proper Medicines into the Blood may succeed, especially in desperate Apoplexies, Anginas, *Hydrophobia*, &c. and whether it may not be often useful to discharge the morbid Blood, and transfuse such as is sound, or warm Milk or Broth in its stead, ought, in my Opinion, to be determined by future and repeated Experiment. PURMANNUS, in his *Surgery*, (*Part III. Cap. 31.*) tell us, that he has not only performed the Operation with Success on others, but also very happily upon himself, being by this means cured, not only of a troublesome Itch, but also of a stubborn Fever. A professed Treatise on the Subject has been published by ELSHOLTZ, intitled, *Clysmatica*

tica Nova, five Chirurgia infusoria & transfusoria, 8vo. 1667. Editio secunda, cum Fig.

IV. For the Transfusion of Blood into the Veins, you are first to open a Vein in the Patient's Arm or Hand, as at Fig. 11 and 12. *Tab. XI.* and then thrust gently upward into it a small Tube of Silver, Brass or Ivory. The same is to be also done with the sound Person; only the Tube must here be inserted downward towards the small End of the Vein. This done, the smallest of the Tubes is to be inserted into the other larger one, by which means as much Blood will pass from the sound Person into the Patient as may be thought proper, and then the incised Veins are to be dressed or bound up as in Bleeding. But if the Patient does not recover after one Transfusion, the Operation should be repeated again at convenient Intervals. But before the Patient receives the Blood of the sound Person, he ought to be bled proportionably, that the new Blood, last received, may have the freer Circulation. Sometimes a Vein is opened in each Arm of the Patient at the same Time, that as much of the vitiated Blood may flow out of one Orifice as he receives of the sound by the other. For more on this Subject, among others, the Reader may consult LAMZWARD in *Notis ad SCULTETUM*, and JUNGKEN *Chirurg. Germanica*, pag. 487. where you have Figures of the Operation. If the Blood is to be transfused out of some Animal into the Patient, then a Calf or a Lamb, for Example, are to be secured by Ligatures, and one of their Veins or Arteries opened, either in the Neck, Leg, or Thigh; and the rest of the Operation managed as before. See *Tab. XI. Fig. 13.* and LAMZWARD in *Append. ad SCULTETI Armament. Chirurg.* and BURMANNI *Chirurg. P. III. Cap. 31.* Lastly, where Tubes of Metal or Bone were found painful and less convenient, for want of being flexible, Operators contrived to fasten an intermediate flexible Pipe betwixt the two others, such as Part of the carotid Artery, or of the Ureter from an Ox, Calf, or Lamb, or the Wind-pipe of a Capon, Duck, &c. by which means the Process becomes much facilitated both to the Operator and Patients.

The Method
of Transfu-
sion.

V. The Contrivance of this Artifice, by which the Blood of one Animal is transfused into the Veins of another, is assumed by Dr. LOWER, in his Treatise *De Corde*, in opposition to M. DENIS, who, in his *French Epistle* upon this Subject, claims the Invention to himself. It is true, the latter made many Experiments in this Way at *Paris*, but with very bad Success. STURMIUS, once a celebrated Professor of the Mathematics at *Altorf*, and VERHIUS, Professor at *Francfort*, attribute the Invention to MAURIT. HOFFMAN: Whereas MUYS asserts, that LIBAVIUS described the Process at large in the Year 1615, but without telling us the Book. The first Injection of Liquors into the Veins of Animals is generally attributed to the celebrated Sir CHRIST. WREN; but I think we have this Artifice described before him, by a Professor of Physic, in a Treatise published *An. 1664*, in which he explains the Process that had never before been heard of in *Germany*. They who desire more on this Subject may consult MAJORIS *Lib. de Chirurgia infusoria*, ETMULLER *Disputat. in eod. Argumento conscript.* ELTSHOLTZ *Chysmatica nova*, PURMANNUS *Chirurgia*, LOWER *De Corde*, SANTINELLUS in *Confusione Transfusionis*, MANFREDUS *De Sanguinis Transfusionis*, STURMIUS in *Philosophia Eclect. Diff. X.* MERCKLINUS *De Ortu & Occasu Transfusionis Sanguinis*, LAMZWARD in *Appendice ad SCULTETUM*, pag. 29.

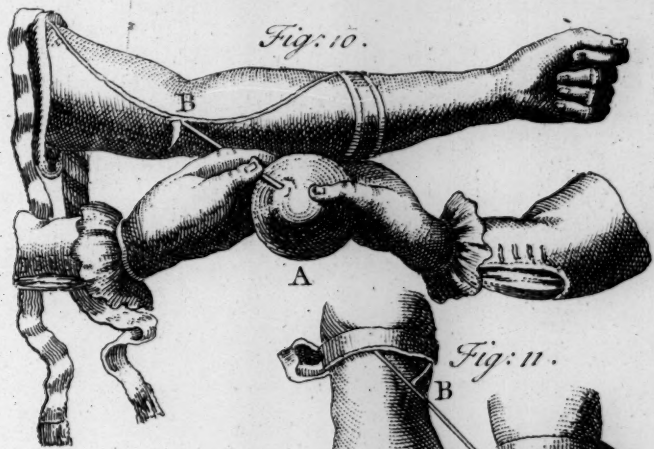
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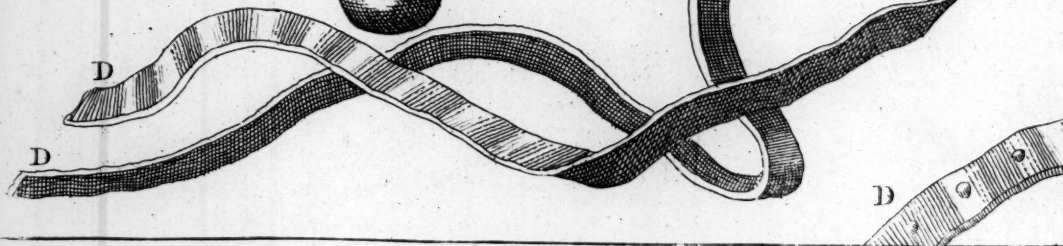
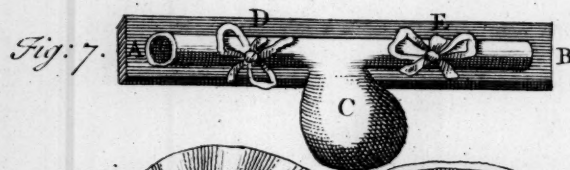
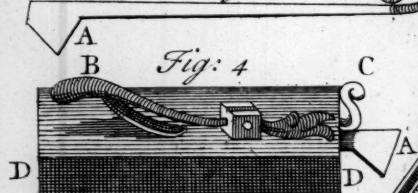
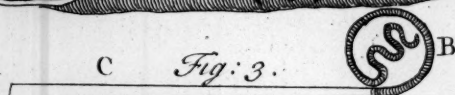
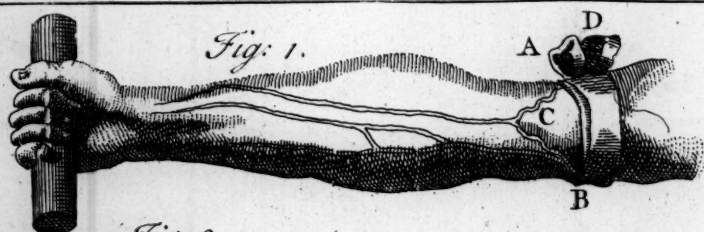
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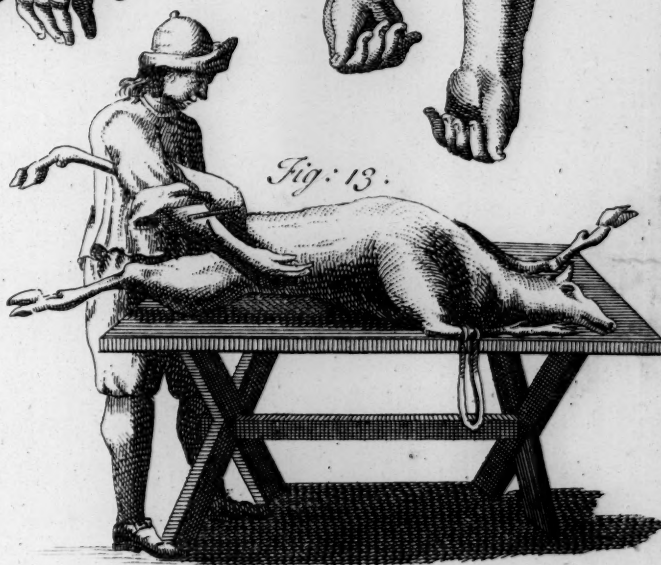
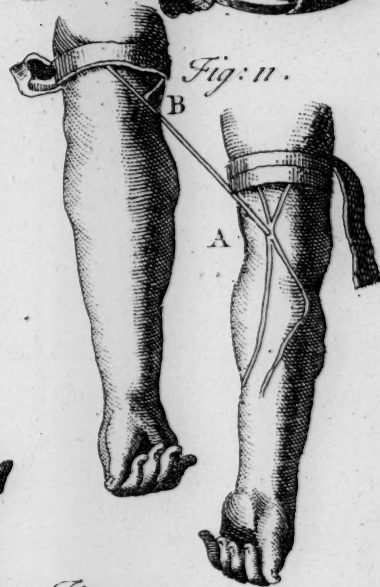
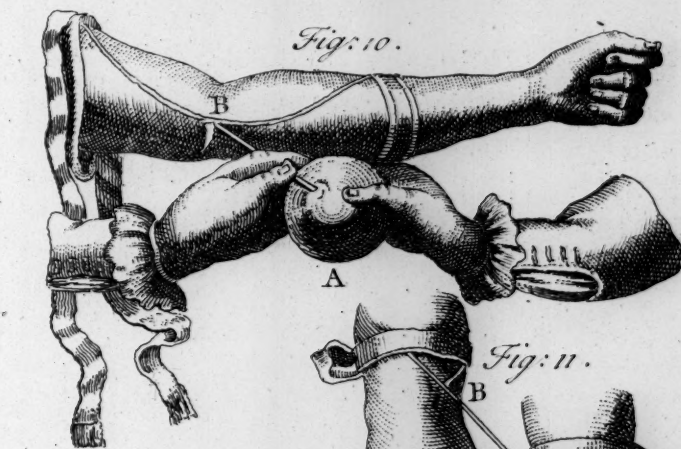
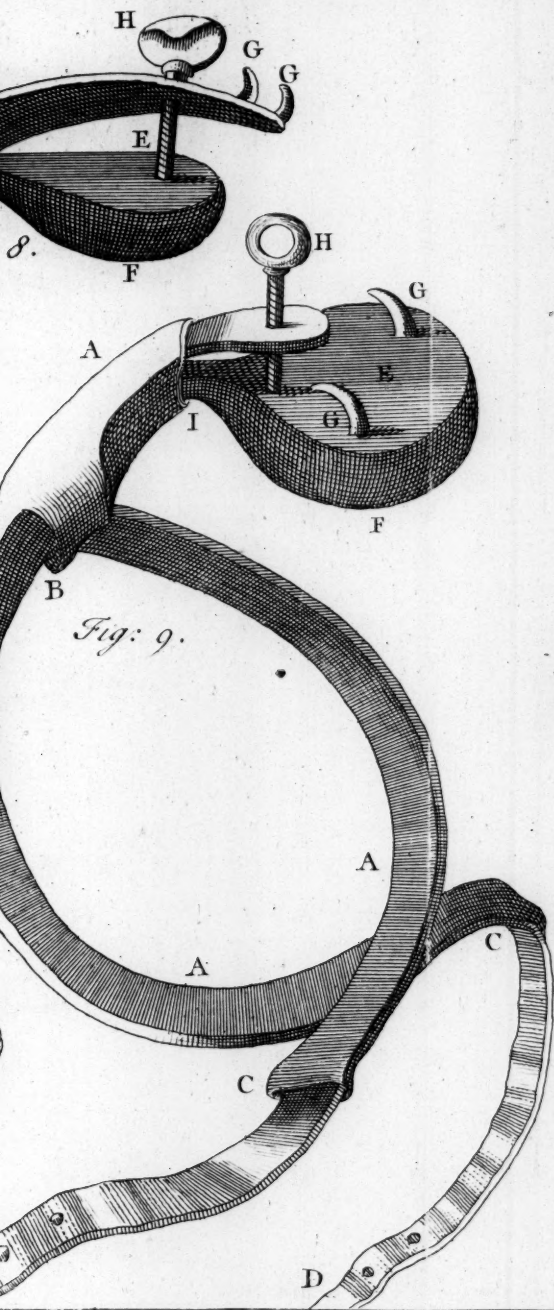
For Injections into the Veins in desperate Diseases, See *Misc. Nat. Cur. Ann.* IX. and X. pag. 144. and LOWTHORP *Phil. Transact. Abr.* Vol. III. page 226 to 235.

An EXPLANATION of the ELEVENTH PLATE.

- Fig. 1.* Represents an Arm in which a Vein is to be opened: A denotes the Cephalic Vein, B the Basilic, and C the Median Vein; D the Ligature fixed above the Elbow to make the Vein swell.
- Fig. 2.* Represents the several Forms of incising a Vein with the Lancet: A shews a longitudinal Incision, B a transverse one, and C, D, oblique ones.
- Fig. 3.* Exhibits the antient *German* Phlebotomus or Fleam for opening a Vein, A the sharp Point to be fixed on the Vein, B the Handle to be held in one Hand, while the Part C is struck by a Fillip of the Finger of the other Hand, so as to drive the Point A into the Vein.
- Fig. 4.* Is a Spring-Fleam, now in Use with some. The Part A being fixed on the Vein, and the Part C being elevated, depresses the Spring by the End B, which by its Reaction or Elasticity strikes the End C upon the Fleam A, so as to drive it into the Vein. DD is a hollow Case of Brass or Silver, in which the Spring-Part of the Instrument B is included.
- Fig. 5.* Represents the *French* Phlebotomus or Lancet, bent so as to form an obtuse Angle, as it should be, for the more convenient holding it in Bleeding.
- Fig. 6.* Is the great Aneurism, as big as one's Head, observed by PURMANNUS in an Arm near the Joint or Bend of it.
- Fig. 7.* Shews the Manner of applying the Ligatures above and below an Aneurism, in the Operation for that Disorder. A B the Artery, C the Aneurism, D the Upper Ligature, E the Lower Ligature.
- Fig. 8.* Exhibits an Instrument contrived both for the Prevention and Cure of Aneurisms. A A A denote the Plate of Iron or Steel adapted in Form to the Form of the Arm, B its Fissure, CC Ligatures fastened to the Ends A A, and extended to D D. E denotes a moveable Steel Plate, joined by the Hinge I, and covered with a Cushion of Cotton or Silk at F, to be fixed upon the Aneurism, G G are two small Hooks by which the Instrument is fastened upon the Arm by the Ligatures C C D D, H is a Screw by which the Plate and Cushion E F are pressed down upon the Tumor.
- Fig. 9.* Represents an Instrument of the same Kind with the former, but of a different Shape. Here the Plate and Cushion E F are larger, for bigger Aneurisms than the former. Its Parts and Explanatory Letters correspond to those of the preceding Figure.
- Fig. 10.* Shews the Apparatus with a Bladder and Tube for Injection of Liquors into the Veins: A the Bladder and Tube, B a Vein of the Arm opened, in which the Tube is inserted.
- Fig. 11 and 12* Exhibit the Transfusion of the Blood from the Veins of one Man into those of another: B denotes the recipient, and A the remittent Arm.
- Fig. 13.* Shews the Transfusion of Blood from the crural Artery or Vein of an Animal into the Arm of a Man by the Intervention of the Tube A.







C H A P. XV.

Of INOCULATION for the SMALL POX.

I. **T**HE Art of ingrafting or propagating the Small Pox by Incision or Inoculation, has been an Operation equally famous in all Nations with those in the preceding Chapter. Therefore we shall, for the Sake of Beginners, describe the Process of it, which under proper Circumstances may be of great Service to Mankind.

The Design
of this
Chapter.

II. The Design of this Operation is, to communicate, by Art, a milder Species of the Small Pox to the Infant or adult Patient, than that received by the natural Infection: and this by ingrafting some of the variolous Matter. In order to which a small Incision^a is to be first made with a Scalpel or Lancet through the Skin of the Arm, and having inserted a small Particle of the purulent Matter taken from a mild Kind of the Pock, the little Wound is then to be dressed with some dry Lint, and covered with a Plaster. After the Operation, the Patient must constantly keep to his Chamber, the Air of which should be moderately warm, and his Diet regulated by some prudent Physician, by which means the Disorder will shew itself in about seven or eight Days, without any malignant Symptoms: And, if assisted by a proper Regimen and moderate Warmth, it usually runs gently through its several Stages. When the Patient has once had the Disorder this Way, though never so mild, we are assured by Experience, that they never have it again: And therefore the Opinion of those seems to be well grounded who think the Propagation of the Small Pox by Inoculation might be of general Use and Benefit to Mankind, in preserving the Lives of some, and the most important Members of others, as the Face, Eyes, Hearing, Viscera, &c.

Inoculation
described.

III. History informs us, that the Disorder was this way propagated many hundred Years ago among the *Greeks* and *Turks*: Whereas it is but of late Years that the *European* Nations have come into it; among which the *English* seem to have approved and followed it most. The Experiment succeeded so well in the Hands of the *British* Physicians, that the late King *George* himself countenanced the same in all his Dominions: And from thence the Practice prevailed with Success in *Germany*, particularly at *Hanover*, *Onolzbac*, and *Pyrmont*.

The Opera-
tion practised
by other Na-
tions.

IV. It must, however, be confessed, that there were many, both among the *French* and *English*, who endeavoured to suppress and vilify this Practice in their public Libels, condemning it as fatal to Mankind, and unfit to be encouraged among a Christian People; but, I think, all they have objected or advanced has been long ago sufficiently answered and obviated by the learned Dr. *JURIN*, and other able Physicians. They who desire more particular Accounts, may consult the Dissertations published by the celebrated Physician last mentioned, as also those by *PYLARINUS* of *Italy*, the celebrated *VATERUS* of *Vitemberg*. *Act. Erud. Lips. Ann.* 1723, 1725. *Act. Natur. Curios.* Vol. I. *Obs.* LXXV. p. 133, &c. And lastly, they may consult Experience, the best Physician of all.

The Ob-
jections a-
gainst this
Practice.

^a But Dr. *HARRIS*, in his *Chirurgical Dissertations*, directs only the Cuticle to be abraded, and the variolous Matter to be spread on the naked Skin.

V. But

My own Opinion of it.

V. But, for my own Part, if I may speak freely, I am so far from thinking the Practice fatal or mischievous, that I rather firmly believe it might, under a proper Management, be of the greatest Use and Benefit to the Lives and Healths of Mankind. For, if I think right, the Small Pox arises from a pestilential Virus or Matter lodged in the Blood from the very first Day of the Birth, which breaks out almost in every Person sooner or later: And the more early, usually the better. For it is very seldom we observe the Pock favourable in those more advanced in Years; So that the Matter seems to multiply itself in the Blood, and augment with the Patient's Age. And this, in my Opinion, is the Reason why we oftener meet with the Small Pox more mild and favourable in Infants than Adults. If therefore the Disorder be procured of a mild Kind by this Operation, and the Blood cleared of its latent Virus, while small in Quantity, and the Infant young, I doubt not but many, and especially the Children of Princes and Nobility, might be thus not only preserved from Death, but even conducted safely through the several Stages of the Disease, without the Insults of its most malignant Symptoms. We are convinced by Experience, as well as Reason, that the Disorder which breaks out from a natural Infection is generally more severe and fatal than that procured by Art: And no Wonder it should be so; since in the last the Physician has an Opportunity of chusing the most favourable Season, and of preparing his Patient beforehand by a proper Regimen, Diet, and Medicines.

C H A P. XVI.

Of SCARIFICATION and CUPPING.

The Method of dry Cupping.

I. Scarification and Cupping was an Operation frequently performed by the most antient Surgeons and Physicians^b, notwithstanding the Moderns have, by their Pride or Neglect, turned the Business over to those who attend the Baths or Hot-houses. Yet, as it makes none of the least Operations in Surgery, we shall here briefly consider and explain the same. The Operation of Cupping is indeed vague, and not confined to any particular Member of the Body. But whenever the Cupping-glass is applied, it is fixed upon the Skin, either entire or scarified: And hence we have a twofold Distinction of Cupping into *dry* and *gorey*. The Figure of the Cupping-glass, for either of these Purposes, is represented in *Tab. XII. Fig. 1.* In dry Cupping, the Glass adheres to the Skin by expelling or rarifying its included Air by lighted Flax or the Flame of a burning Candle within it, so that the Glass is pressed upon the Part with a considerable Force by the external Air; in which Artifice our ordinary Cuppers are sufficiently well versed. The Use of this dry Cupping is twofold; either to make a *Revulsion* of the Blood from some particular Parts affected, or else to cause a *Derivation* of it into the affected Part upon which the Glass is applied. Hence we have a Reason why HIPPOCRATES^b orders a large Cupping-glass to be applied under the Breasts of Women who have a too profuse Discharge of their Menfes, intending thereby to cause a Revulsion of the Blood upwards

^a As we read in HIPPOCRATES, CELSUS, GALEN, &c.^b Sect. V. Aphor. 50. from

from the Uterus. And upon the same Principle I have myself successfully cured a profuse Hæmorrhage at the Nose, and an Hæmorrhage or Spitting of Blood from the Lungs, by applying Cupping-glasses to the Legs and Feet, particularly about the Ancles and Knees. SCULTETUS give us a remarkable Instance in *Obs.* 85. of a Woman, who, by the repeated Application of six Cupping-glasses (without Scarification) to her Thighs, was not only relieved of the troublesome Symptoms, caused by an Obstruction of her Menfes, but was also thereby freed from the Obstruction itself. Dry Cupping is also used with Success to make a Revulsion by applying the Glasses to the Temples, behind the Ears, or to the Neck and Shoulders, for the Removal of Pains, Vertigos, and other Disorders of the Head. ^a They are also applied to the Upper and Lower Limbs to derive Blood and Spirits into them when they are paralytic; and, lastly, to remove the Sciatica and other Pains of the Joints. ^b The Operation is, in these Cases, to be repeated upon the Part till it looks very red, and becomes painful.

II. But Cupping is much oftener joined with Scarification, than used alone with us in *Germany*, and in other northern Countries: In which Case, the Part is first to be dry cupped till it swells and looks red, and the Skin is to be punctured or incised by the Scarificator, *Tab. XII. Fig. 2.* with which you may make sixteen or twenty small Wounds in the Skin, close enough to each other to be covered by the Cupping-glass, into which the Blood ought to flow from them. (*See Fig. 3.*) In repeating these Incisions, and re-applying the Cupping-glass upon fresh Parts of the Skin, the Operator must observe to begin at the lowest Part, and thence ascend gradually, that his Work may not be obscured by the reflux Blood from above. Having scarified the Skin, and applied the Cupping-glass with Fire, as before directed, the latter will adhere firmly to the Part, and the Pressure of the external Air will force a considerable Quantity of Blood into it from the Incisions. But as several Glasses (sometimes six or eight) are often applied at one and the same Time, and to different Parts of the Body, the Operator must manage his Business so that some Glasses may be filling, while he is scarifying and adapting the others: And in thus shifting them alternately, he must pour out their Blood into a Pan or Vessel, wash them in warm Water, cleanse the Skin with a Sponge dipped in the same Water, and then apply the Glasses as before. When the Blood ceases to flow fast enough, you must repeat your Incisions with the Scarificator close by the former, and re-apply your Cupping-glasses till a sufficient Quantity of Blood is drawn, or till it stops of its own accord. Your Operation being finished, and the Skin well cleansed with a Sponge and warm Water, it is next to be rubbed over with a Bit of Deer's Suet to promote the Healing. But if the Blood still continues to flow, which it does but seldom, you are then to wash the Skin with *Sp. Vini, Aq. Reg. Hungar.* binding it up with a Compress and Bandage.

III. The modern Surgeons have, for Conveniency to themselves and Ease to the Patient, contrived a Scarificator, different from the last mentioned, which consists of sixteen small Lancet-blades fixed in a cubical Brass Box, with a Steel Spring, as at *Fig. 4. Tab. XII.* When the Side of this Instrument marked CCCC is applied to the Skin, and the included Spring bent by the Lever A, by depres-

Cupping
with Scarifi-
cation.

The modern
Scarificator.

^a See CELSUS, *Lib. iv. c. 2.*

^b See DECKER's *Exercit. p. 34.*

pressing the Button B, it is so suddenly let loose as by its Force to strike the Points of the sixteen Blades out of the Case at one Instant into the Skin, making as many small Incisions at once in their regular Order, over which the Cupping-glass is to be applied, as we before directed. We meet indeed with the Figure of a Scarificator not much differing from this in PAREY's Surgery, *Book XI. Chap. 5.* and after him in LAMSWARD's Notes to the *Armamentarium* of SCULTETUS. But they do not propose the Instrument for other Uses than to scarify the unsound Parts in an incipient Mortification: Whereas this is used with good Success by our Cuppers in many other Diseases, as I myself have frequently seen and experienced. Though M. GARENGEOT* condemns it as a bad and useless Instrument: But perhaps that Gentleman never saw the Use and Effects of it.

Uses of Scarification.

IV. Cupping with Scarification is used in various Parts of the Body, particularly in the Head, Neck, Shoulders, behind or under the Ears, Occiput, Back, and Loins, Legs and Arms, and near the^b Ancles: And this for making a Derivation, Revulsion, or Evacuation in the various Disorders incident to plethoric Habits; such as various inflammatory Disorders in the Head, Eyes, Ears, Tonsils, and Uvula, particularly violent Head-achs, Ophthalmias, Amauroses, Suffusions, &c. In all which Cases it is hardly possible to express the general Benefit which may be received from this Operation, especially when timely used, and judiciously repeated at proper Intervals. Nor is Scarification much less beneficial than Phlebotomy in those Patients, whose Veins are so small or obscurely situated, that it would be dangerous opening them by the Lancet: Yet as it is often absolutely necessary to make a Discharge of Blood some way from them, I have often advised this Method to be followed, and with good Success. The excellent Anatomist MORGAGNI^c advises Scarification upon the Occiput in Apoplexies, and all soporose Affections, as one of the best Remedies that can be recommended, either from Reason or Experience: Because in this Way the heaving Blood may be discharged from the obstructed Veins of the Brain, which communicate with those of the Occiput, or at least it may, by this means, obtain a more free Motion: But then you ought to scarify deep, as he observes. Scarification and Cupping upon the Occiput is also extremely useful in an Ophthalmia, or Inflammation of the Eyes, and a like Discharge procured by deep Scarification upon the affected Side in a Pleurisy, after Phlebotomy premised, gives great Relief, according to LANCISI^d. Lastly, this Method of evacuating by Scarification and Cupping, makes one of those which are generally repeated at stated Seasons of the Year, like Bleeding and Purging, Spring and Fall, &c. which the Patient being once accustomed to, ought never to neglect them, for fear of incurring their former, or even worse Disorders.

Scarification by some rejected and despised.

V. I must indeed own, that there are many among our Physicians and Surgeons who condemn this Operation as of little or no Efficacy: And the Reason which they offer is, that hereby only that Blood is discharged which lodges itself betwixt the Flesh and Skin. But this Judgment seems too hastily formed, and

* *Traët. De Instrument. Chirurg.* Tom. I. pag. 413.

recommended by Jo. TAC MANN, of Padua, in a Treatise, published A. 1583.

Anatom. V. pa. 83. & VI. pag. 108. ZACUTUS LUSITANUS also mentions a Patient freed from an Apoplexy by repeated Scarification.

^b Scarification of the Ancles is highly

^c *Adversar.*

^d *Ibid. Advers. Anat.*

without

without a just Foundation. For Experience hath taught myself and many other eminent Physicians, that as much and as thick Blood may be discharged by Scarification and Cupping, as by Phlebotomy, and consequently it must be little less, if not equally beneficial, in all those Disorders which require Bleeding. But this I can boldly affirm, from my own Reason and Experience, that in some Cases Scarification excells Phlebotomy, in as much as the Cupping-glass, by firmly adhering to the Skin, not only draws out the Blood, but also gives it a greater Impetus or Tendency towards the scarified Part; and therefore it constantly gives certain and speedy Relief in most Disorders of the Head, Eyes, and Ears, Apoplexies, sleepy Disorders, Inflammations of the Tonsils, Hæmorrhages, and Pains of various Kinds, &c. sometimes by Revulsion, and sometimes by Derivation.

VI. There are again other Physicians, who imagine Scarification to be not only useless, but even pernicious: For, say they, We have Instances of Patients who have been not only violently disordered, but even killed by the Operation being performed at an improper Time, or with an unclean or infected Instrument. ^{Whether Scarification be dangerous.} Thus a Patient may be in danger of catching some foul Disorder by being scarified with an Instrument that has not long before been used upon one infected with the Leprosy, Pox, Itch, &c. for thus the Infection will be inoculated almost in the same Manner with the Small Pox^b. But if Scarification must be condemned and rejected on this Account, so must also Phlebotomy and many other Operations, in which the same Instrument is applied that has been used before. But that the Patient may have no Uneasiness from this Quarter, it may not be improper for him to see that his Cupper's Scarificator and Apparatus are very clean: Or else they may keep a Scarificator of their own, which being kept clean and dry, can give no room to make any frivolous Scruples of this Nature.

VII. There still remains another Sort of Scarification, used by Surgeons in violent Inflammations, incipient or confirmed Mortifications, pestilential Carbuncles, and the like. In which Cases it has been found highly serviceable to discharge the stagnant and vitiated Blood, by making many small Wounds or Incisions in the Skin with a Scalpel or Lancet, though without the Assistance of Cupping-glasses. This Kind of Scarification is usually denominated *Chirurgical* by the Cuppers, in Contradistinction to theirs: As Surgeons use it frequently in Gangrenes and Mortifications, and sometimes in swelled Legs and Dropsies, especially that of the *Scrotum*, and sometimes for the *Hydrocephalus*. But though it may be sometimes highly necessary to scarify the Legs of dropical Patients, when the Skin is distended so as almost to burst: Yet it ought not to be made indiscriminately, without absolute Necessity, and a proper Regard to the Patient's Age, Habit, &c. Otherwise it is even probable, that the scarified Part will gangrene or mortify, and destroy the Patient. PLINY (*Hist. Nat. Lib. LXXVIII. Cap. 1, & 11.*) recommends Scarification of the Gums for the Tooth-ach; which, in my Opinion, may not unfrequently be very useful.

^a Thus HILDANUS, *Cent. V. Obs. 71.* remarks, that a Palsy arose from hence, though it might proceed from a Multitude of different Causes.

^b Vid. JORDANUS *De lue novâ in Moravia.* SPORICHIUS *De Symptom. Crudel. a Scarificatione.* LIBERIUS *De malitiosâ scarificatione, in Obs.* GREG. HORSTIS, *L. IV.*

The Egyptian Scarification.

VIII. Related to Scarification is the Infliction of small Wounds within-side the Nose, Lips, Ears, and Gums, used by the *Egyptians*, and recommended by ^a CELSUS and ^b ARETÆUS for abating Inflammations, and relieving various other Disorders, in which it very often succeeds admirably. At which we need the less wonder, if we consider what Relief Nature herself often gives the Patient, by making a plentiful Hæmorrhage at the Nose, in ardent Fevers, Head-achs, &c. Add to this, that the *Egyptians*^c had a Practice of beating or whipping the Calves of the Legs with Rods, till they looked red, and then scarifying, or making Incisions in the Skin: By which means they procured Relief, and made useful Revulsions from the Head and Brain in violent inflammatory Disorders of those Parts, and in Fevers with Delirium, Watchings, &c. But notwithstanding the Usefulness of this Practice, it is at present hardly so much as known among our *European Nations*.

Scarification of the Eyes.

IX. Many of the antient Physicians and Surgeons, with HIPPOCRATES, had a Practice of scarifying the Insides of the Eyelids, and even the Eyes themselves, with a proper Instrument for the Purpose, in many of the Disorders which infest that Organ, as is very apparent from the Treatise which HIPPOCRATES has left, *De Visu*^d. This Operation of scarifying the Eyes, though neglected from the Time of HIPPOCRATES, has yet been renewed, or lately introduced again, by the *English Oculist* WOOLHOUSE, at *Paris*: And it has been also performed with tolerable Success by some others of the present Age, as we have Accounts. But for the Instruments, and Manner of performing this Operation, we shall be more particular in our following Account of the Operations for the Eyes.

CHAP. XVII.

Of BLEEDING by LEECHES.

Choice of the best Leeches.

I. **L**EECHES, or *Sanguisugæ*, are a Species of aquatic Worms or Insects, of the Shape represented in *Tab. XII. Fig. 5.* which being applied to any Part of the Body, bite through the Skin, and extract Blood from the small Veins, which frequently conduces much to the Health and Recovery of a Patient: For which Reason they have been used from the most early Times by the antient *Greek and Roman Physicians*, as may be seen in *GALEN's* professed Dissertation on this Insect, commented on by *SEBEZIUS*. As there are Leeches of different Kinds and Natures, it will first be proper to distinguish and make a due Choice of the best. These are always found in clear Brooks or Rivulets: Whereas those taken from Lakes, Fish-ponds, and stagnant Waters generally have something malignant in their Bite, insomuch as sometimes to excite great Pain, Inflammation, and Tumor in the Part, and Uneasiness in the whole Body.

^a *Lib. IV. Cap. 2.* where he directs to draw Blood from the Nose in violent Head-achs.

^b *De Chron. Morb. Lib. II. Cap. 11. De Cephalia*, pag. 128.

^c *PROSP. ALPINUS, Medicina Ægyptior. p. m. 72.* where you have a Figure of this Practice.

^d *CELSUS* likewise advises Scarifications in the Head for many Disorders of the Eyes, and particularly violent Inflammations, *Lib. VI. Cap. 6.* The Success of which I myself have experienced.

It is also an Observation made by some of the most expert Surgeons, that the best Leeches have slender and pointed Heads, with greenish and yellowish Lines or Streaks on their Backs, and their Bellies of a reddish yellow: Whereas those are the worst, or most malignant, which having a thick and obtuse Head, and incline from a dark blue to a black Colour on the Back and Sides. But you ought to observe it as a necessary Caution, never to apply Leeches which have been lately caught in Rivers or foul Waters, before they have been kept some time in a Glass full of clean Water, to be often shifted, that they may cleanse themselves from what Filth or Venom they may have imbibed: And when they have been thus kept for a few Months, they may be afterwards safely used, without incurring any bad Accident.

II. Before the Leech is applied to the Skin, it should be taken out of the Water to stand about an Hour in an empty Cup, or other Vessel, to drain itself; Method of applying them. that being thus rendered thirsty and empty, it may both adhere more firmly to the Part, and draw off a larger Quantity of Blood. As for the Part to which they may be applied, that may be on the Temples or behind the Ears, when the Disorder lies in the Head or Eyes, and especially when the Patient is delirious in a Fever, or overcharged with Blood. But sometimes they may be commodiously enough applied to the Veins of the *Rectum*, in Disorders proceeding from an Obstruction of the wonted Evacuation this Way, or in the blind and painful Piles: And by Way of Revulsion they will be here usefully applied in profuse Hæmorrhages of the Nose, and spitting or vomiting of Blood; in which Cases they are of incredible Service, especially when the Disorder arises from Obstructions of the hæmorrhoidal Flux. But before you apply the Leech, the Skin of the Part must be first well rubbed till it becomes hot and red. Which done, you take hold of the Leech by its Tail with a dry Cloth, or you may place it leaning half way over the Edge of a Cup, and so apply it that it may creep out upon the Part; which they are no sooner fixed upon, but they generally bite and draw the Blood very eagerly. When several Leeches are to be used, you must apply each of them to the Part in this Manner successively: and if they should refuse to bite or adhere to the Skin, as they sometimes do, you may, in that Case, put a little Blood of a Pigeon, Chicken, &c. upon the Skin. But if that will not allure them, you must apply fresh Leeches in their stead. The Application of Leeches to the Caruncle in the greater or inner Canthus of the Eye, is found to be extremely useful in all inflammatory Disorders of that Organ, after Phlebotomy has been first premised.

III. When the Leeches are distended with Blood, they generally separate Treatment after their Application. from the Skin, and leave the Part of themselves. But if it be necessary to draw still a large Quantity of Blood, you must either apply fresh Leeches, or else cut off the Tails of those which are drawing with a Pair of Scissors, by which means the Blood will run through them, and they will draw almost as long as you please. If the Leeches do not separate spontaneously after a sufficient Quantity of Blood has been evacuated, upon sprinkling a little Salt or Ashes upon the Part, they usually leave it presently: Which Method should be the rather taken, because forcing or pulling them away often occasions a Tumor and Inflammation of the Part. The Operation being thus finished, those Leeches which are whole may be returned into the Glass again and reserved for future Uses: But those die which have had their Tails cut off. The Wound made by this Insect may be first washed with warm Wine or Water, and then dressed with some vulnerary

nerary Plaster: Though there is seldom any Occasion for the latter, as it generally heals up fast enough of itself. They who desire more upon this Insect, may consult GALEN, ALDROVANDUS, GESNERUS, BOTALLUS, PETR. PAUL. MAGNUS, SEBIZIUS, HEUNIUS, CRAUSIUS, SCHRADERUS, STAHLIUS, &c. who have wrote thereof more at large.

C H A P. XVIII.

Of ACUPUNCTURATION, used by the Chinese and Japonese.

Somewhat a-kin to Scarification is the famous Operation of the *Chinese* and *Japonese*, termed *Acupuncturation*. Those Nations rejecting Scarification and Phlebotomy as pernicious, have Recourse to their Acupuncturation and Cauterization, or burning with *Moxa*, as their most potent Remedies in almost all Disorders. The first of these Operations they perform with a large Gold or Silver Needle (*Tab. XII. Fig. 6.*) which they strike into the Flesh, either with their Hand or the little Hammer, *Fig. 7.* It is indeed more than a little surprising, that so desperate and severe an Operation should be so much practised by a People in other respects judicious: And that too, in the Head, Breast, Abdomen, Arms, Legs, Thighs, and most other Parts of the Body, even in the Abdomen of Women with Child, when the Fœtus is restless. But I do not know that the Practice has been received by any of our *European* Nations: And therefore, as the Process is so much abhorred, we shall not here give a prolix Account thereof. They who desire more, may consult RHYN *De Arthritide*, pag. 145, 183, 190; and KOEMPFER in *Amœnitatibus exoticis*, pag. 582; also in his Description of *Japan*: In which Country both these Surgeons where Spectators of the Operation.

C H A P. XIX.

Of ISSUES.

The Seat
of Issues.

ISSUES are little Ulcers made designedly by the Surgeon in various Parts of the Body, and kept open by the Patient, for the Preservation or Recovery of his Health. They are by some^a denominated *Cauteria*, but improperly: Because by that Term we usually mean a caustic or corroding Medicine. In this Operation the Physician endeavours, by Art, to imitate and relieve Nature; who often forms Ulcers in various Parts of the Body of her own accord, for discharging pernicious Humours, whereby People are often freed from grievous Disorders, and enjoy a healthy State. The Parts in which Issues are generally made, are either, (1.) the upper Part of the Head; (2.) the Neck; (3.) the Arms, betwixt the Biceps and Deltœide Muscle, near the Insertion of the

^a CAPIVACCIUS has a Dissertation *De recta Cauteriorum Administratione*, in which he treats only of Issues, which the *French* also term *Cauteres*.

last;

last; (4.) in the Thighs, especially within-side, immediately above the Knee, in a Cavity easily felt by the Fingers; and lastly, (5.) Issues are sometimes made in the Legs, on their interior Side, in a Cavity immediately below the Knee.

II. Though there are several Methods of making Issues, yet none seem to be more ready than the following: *viz.* First, to mark the proper Place with Ink; and then elevating the Integuments betwixt the Thumb and Fore-finger of the Surgeon and an Assistant on each Side, you next proceed to make an Incision through them, either with the Scalpel or Lancet, big enough to admit a Pea. Which being inserted and covered with a Plaster and Compress, nothing more is wanting than your Roller to compleat the Operation. Thus by cleansing and dressing the Wound every Morning and Evening with a fresh Pea, it by Degrees, in a Day or two, degenerates into a little Ulcer, discharging daily a Quantity of purulent Matter; which should be carefully cleaned or wiped off at every Dressing.

The first Method of making Issues by Incision.

III. There is a second Method of making Issues by wounding the Skin with a red-hot Iron, or actual Caution; which is usually included in a Sort of Capsula, or Case of Iron, *Tab. XII. Fig. 8.* A, to conceal it from terrifying the Patient. When the Case B B is fixed upon the proper Part for the Issue, the Caution, or red-hot Iron C, is then pressed down upon the Integuments, and the Eschar or Burn, is next to be dressed with fresh Butter, or *Ung. Basilic.* till it at length separates in repeating the Dressing every Day. Then the little Ulcer formed is to be filled with a Pea, and dressed as before. Though this Method of making Issues, according to the Antients, is more severe, yet it must be equally more efficacious than the other; as the Pain and Caution must necessarily make a considerable Revulsion. But there are very few Patients who will submit to it.

A second Method by the actual Caution.

IV. The third and last Method of making Issues, is, by the Application of potential Cautiones, or corroding Medicines: In order to which, a Piece of Plaster is first perforated, as in *Tab. XI. Fig. 11.* and then applied, so as its Aperture may cover the Place marked with Ink for the Issue. A Piece of the Caustic, mentioned *Part I. Book IV. Chap. III. Sect. XI.* is then imposed upon the Aperture of the Plaster, and retained close down upon the Skin with some scraped Lint, a small Compress, and a large Plaster; and lastly, with a larger Compress and Bandage. The Operation thus far advanced, the Patient is now to be ordered to rest about six or eight Hours, more or less, according as the Caustic may be in Strength: Which Time being elapsed, and the Dressings removed, the Eschar is to be treated as we before directed at *Sect. III.*

A third Method by Caustics.

V. But in whichever of these Methods you make the Issue, it must be dressed at least twice every Day, especially if it runs well, and in the Summer time; And at each Dressing you must put in a fresh Pea, and cover it with a clean Plaster, or Piece of waxed Paper or Silk, or an Ivy-Leaf, retained with Compress and Bandage. But the Deligation for Issues is much more commodiously performed with a leathern Swath, fastened by Clasps, as in *Tab. XII. Fig. 9.* than by a circular Linen Roller. It is remarkable, that some use Peas of Silver or Wood to dress their Issues with, instead of the common ones: But the Difference in their Effects is not material. In this Manner Issues are to be kept open, till the Patient is recovered of the Disorder for which they were made; and

and in some Cases they should be continued as long as the Patient lives: Or if the same Disorder, or some other, returns upon drying them up, they must be again opened immediately.

Use of
Issues.

VI. Issues are used chiefly for various Disorders in the Head, Eyes, Ears, the Teeth, or Sciatica, and other painful Disorders, which are this way frequently relieved or cured. The Use and Advantage of Issues is well known, and daily experienced by most Surgeons^a, contrary to the Opinion of HELMONT, and some others, who think they serve only to torment and trouble a Patient. However, I must frankly own, that a Cure is not to be expected from Issues; and though they generally give some small Relief, yet in many Cases I have found it too inconsiderable to be sensible: But if, upon Trial, they afford no great Benefit, it is best to dry them up again in a little Time. But we must not forget to take notice, that it is frequently necessary to make two or more Issues, to produce any considerable Effect in stubborn Disorders, as one in each Arm, or in one Arm and Leg of the same Side, &c.

Method of
drying up
Issues.

VII. In order to close up an Issue, when that shall be judged proper or necessary for various Reasons, little more is required than to discharge the Pea, and refrain from putting in any more, by which means alone it will close up in a short Time. But if any proud Flesh should protrude itself, it may be amputated, or else removed and taken down with *Alum. ust.* Lastly, it is observable, that when Issues of People far advanced in Years cease to make their wonted Discharge, and turn of a livid and blackish Hue, it is a Sign they are invaded by some desperate Disorder, and that even Life itself is very near its Period. In this Case proper topical Remedies should be speedily applied, as *Cantharides*, *Rad. Irid. Florent. vel Helleb. nigr.*

CHAP. XX.

Of BLISTERING with CANTHARIDES.

Blistering
described.

I. **B**Y Blistering is understood an Elevation of the Cuticle, from the Cutis into Vesicles, or Bladders replete with a serous Humour, by the Application of external Remedies, and chiefly Cantharides, to the Skin, which may be applied either in form of a Paste mixed up with Yeast; or else mixed with some Emplaster, and then spread on Linen or Leather, which is the modern Practice: And therefore we constantly meet with the *Emp. Vesicator.* ready prepared in the Shops of Apothecaries. These being applied and retained upon the Part with Bandage and Compress, in about eight, ten, or twelve Hours Time, will raise the Cuticle under the Plaster in a Blister, replete with a thin and acrimonious Lymph. The beforementioned Number of Hours being expired, the Blister-plaster is removed; and the Cuticle, if yet entire, is opened with a Pair of Scissors, its Contents being gently absorbed by Lint or soft Linen. This

^a Vid. GALVANI *Trattato delle Fontanelle*. GLANDORPII *Gazophylacium*, &c. *Æt. Hafniens.* Vol. iii. xii. MUYSII *Prax. Med. Obs.* 2. SCHELHAMMERUS, FRED. HOFFMANNUS, HILSCHERUS, &c. in *Dissertationibus*.

done,

done, the Part blistered is dressed with some soft and cooling Plaster, which Dressing is repeated every Morning and Evening, till the Discharge ceases, and the Part heals. And though it is remarkable, that the Cuticle is separated from the true Skin by this Plaster, in the same Manner as it is in Burns; yet it meets with so sudden a Reproduction, as is not a little surprising. Some make their Dressings with Beet or Dock-leaves, spread with fresh Butter, instead of a Plaster.

II. The Size of Blister-plasters varies greatly with the Nature of the Patient's Disorder, and the Size or Figure of the Parts to which they are to be applied. The Size of Blister-plasters. Those for the Temples and behind the Ears, may be about the Size of a Crown Piece: As may also those for the Neck and Arms, Legs and Thighs, and the Top of the Head. But those for the Back and between the *Scapulae*, may advance to two Hands Breadth.

III. Veficatories are frequently of very great Benefit, as well as Issues, in many of the most obstinate Disorders: Especially when vicious Humours are to be discharged from the Blood, or a strong Revulsion to be made from any Part. The Use of Blister-plasters. Thus Veficatories are of excellent Service behind the Ears, upon the Head, Neck, Arms, &c. in all Inflammations of the Eyes, and Suffusions or incipient Cataracts: As they likewise are in all lethargic and paralytic Affections: In which Cases they give a Stimulus to the Blood and Spirits, and excite those Fluids from a languid to a brisk Motion. Strong Veficatories are also frequently used in ardent Fevers attended with a Delirium: In which Disorders they are properly applied to the lower Extremities, in order to diminish the Influx of Blood sent to the Head and Brain. Lastly, Blisters are used with great Success in the Small Pox*, when the Pustules seem to strike in; as also in the more obstinate arthritic and rheumatic Complaints, where they are best applied even to the Part in Pain, according to the Observation of SCULTETUS (*Obs.* 73.) Blisters are also of great Efficacy when applied to the Legs and Thighs in Asthmas; and a little below the Elbow for the Tooth-ach.

IV. When the Disease requires a considerable Discharge this Way, it may be convenient to mix a little Powder of Cantharides with the Ointment or Plaster, with which the Blister is to be constantly dressed: By which means greater Benefit may be obtained than one would imagine, in many of the most obstinate Diseases. How to increase the Force of Blisters.

V. There is another Case, in which *Cantharides* are of great Service. When Issues, or Ulcers of the Legs, which are of long standing, stop, either spontaneously, or from some Disorder (especially if the Patient is advanced in Years;) in this Case sprinkle *Cantharides* on the Issue or Ulcer: Let a Piece of Blistering-plaster be made in the Form of a Pea, and be applied to the Part. The Humours that before ceased, will generally be provoked by the Stimulus of the *Cantharides*, and be discharged again to the great Benefit of the Patient. Add to this, that in some Wounds (particularly after the Operation of Lithotomy) where the Lips of the Wound become callous, the Application of *Cantharides* destroys the Callosity; and the Wound heals without Difficulty. See CHESLEDEN, and DOUGLASS, *Lib. de Litbot.* But this Application is sometimes attended with an *Ardor Urinae*, or great Heat and Pain in making Water; especially if the Blisters are several in Number, and stronger, or continued longer on the Parts than usual: In which Case the Patient suffers the same Symptoms as Blisters often accompanied with Ardor Urinae.

* See FREIND's excellent *Treatise on Fevers and the Small Pox.*

if he had taken *Cantbarides* internally. But then these troublesome Symptoms are as quickly removed by a frequent and plentiful drinking warm Milk, and amygdalate Emulsions. Lastly, Blisters should not hastily, but with great Caution, be used for Patients who are hydropic or cachectic; because they frequently produce an incipient or confirmed Mortification. See BAGLIVI on Blisters, HOFFMAN, VATER, and others.

C H A P. XXI.

Of INJECTIONS.

Of Injections I. **M**ANY Disorders are very difficultly, if at all, curable, unless the Parts affected are injected with some proper Liquor, by means of a Syringe and a proper Tube. Which Operation is by Surgeons called *Injection*, and consists chiefly in drawing the Liquor into the Syringe, and forcing it out again into the disordered Parts. The Method of performing which is too obvious for any body to be ignorant of. But this Observation may be necessary, To apply the Syringe and Tube to the Parts very carefully, especially in very sensible or nervous Parts, to avoid giving the Patient too much Pain: Also to be mindful, that the Liquor you inject be not too hot or cold. But what Kinds of Liquors and Methods are to be used for Abscesses and fistulous Ulcers, we have before observed (in the Book on *Ulcers*, Chap. II. N. III.)

In Disorders
of the
Mouth and
Fauces.

II. In Ulcerations and Inflammations of the Tonsils, Uvula, and Fauces, Injections are generally useful: But Care is to be taken to press down the Tongue with a Spatula (*Tab. I. litt. P*) or the flat End of a Spoon; and having introduced the Syringe two or three Fingers Breadth into the Mouth, the Injection is to be gently thrown in, several Times. A proper Syringe for this Purpose is described by DEKKERUS (*Exercit. Pract.* pag. 242.) furnished with a crooked Tube, whose Extremity is perforated with several small Holes, as in *Tab. VI. Fig. 11*. This Instrument is particularly useful, when the Patient's Mouth cannot be easily opened by a Spatula, which is often the Case.

In Gonorrhœas.

III. Injections are also frequently thrown into the Urethra of the Penis, in Men under a Gonorrhœa, in order to wash out the corrupt Matter, and mitigate the Heat, Acrimony, and Pain. The best Syringe for this Purpose is that in *Tab. IV. Fig. 10*. fitted with a convenient Tube to enter the Penis. Also the Syringe in *Tab. XII. Fig. 10*. may be very commodiously used in this Case; because the Liquor does not easily fly out of it behind. The most convenient Liquors for abating the Heat and Pain in this Disorder, are, warm Milk and Barley-water, sweetened with Sugar, Honey, or Syrup of Marshmallows: And after the Use of these, when we would heal up and strengthen, or gently astringe the Parts, we may use the following Mixture with Success:

R. *Aq. Plantag.* ℥iv. *Mell. Rosat.* ℥j. *Sacch. Saturni* ℥j. *M. f. Injunctio.*

In Disorders
of the Uterus.

If a small Stone should happen to stick in the Urethra, its Exit may be very much promoted by injecting Oil of sweet Almonds or Olives by the Penis. For Disorders in the Uterus, to expel the After-burthen, when it adheres too strictly to the Womb, or to cure Ulcers that Part, or cleanse the *Fluor Albus*,

bus, it is convenient to inject some deterging and healing Liquor, by the Syringe which MAURICEAU has described for that Purpose. See *Tab. VI. Fig. 12* and *13*. But when this Syringe is used, the Surgeon should be careful that its foremost high Tube be cautiously introduced into the Vagina. To answer this End in a stubborn *Fluor Albus*, I have experienced the Syringe at *Tab. XII. Fig. 10*. to be very convenient.

IV. Lastly, for the Manner in which Liquors are to be injected into the *Thorax* or *Abdomen*, to cure Ulcers or Wounds in those Parts, that has been before described, when we treated of Wounds. As to the Liquors which are injected by the *Anus*, under the Title of Clysters, we shall consider them when we come to treat of the Operations proper to that Part.

In Disorders of the Thorax and Abdomen.

C H A P. XXII.

Of ACTUAL CAUTERIES.

I. CAUTERIES are by Physicians and Surgeons distinguished into two Classes, actual and potential. By actual Cauteries they intend red-hot Instruments, usually of Iron, which are applied to many Parts and Disorders. By potential Cauteries we understand certain Kinds of corroding Medicines, of which we shall speak hereafter in *Chap. XXIV*. Of actual Cauteries, or hot Irons, it is necessary for the Surgeon to have a considerable Apparatus: Inasmuch as different Disorders require Cauteries of various Sizes and Figures. Notwithstanding there are a greater Number of cauterising Instruments described and figured by the Writers in Surgery^a, the chief of which we have given you in *Tab. III*. yet it may be necessary for the skilful Surgeon to invent others, suitable to the particular new Disorders which may sometimes occur to him.

The several Sorts of Cauteries.

II. Cauteries have various and manifold Uses. For they are not only used to destroy the dead Parts of carious Bones, in Cancers, to remove *Schirri*, Excrescencies, Carbuncles, and mortified Parts; but also to make Issues and Setons, to stop Hæmorrhages in Wounds and Amputations: And, Lastly, to remove an Amaurosis, Epilepsy, Sciatica^b, with Pains in the Teeth and other Parts. We are therefore so far from condemning the Use of Cauteries, as have SEPTATIUS, HELMONT, BONTEKOE, OVERKAMPIO, CRAHN, &c. that we rather recommend them as eminently serviceable in many of the beforementioned Disorders. They who are desirous of seeing more upon this Subject, may read ALBUCASIS ARABS and SEVERINUS concerning the wonderful Effects of cauterising, in his elegant Book *De Efficaci Medicina*, &c. He may likewise consult Jo. COST. Prof. Bonon. *de igneis Medicinæ Præfidiis*, Venet. 1595. To these add FIENUS and BARTHOLINUS *De Cauteriis*.

The Use of Cauteries.

III. For the right Application of Cauteries, various Observations are necessary. In the first Place, the Surgeon should see that the Size and Figure of the Cautery correspond to that of the disordered Part: And while the Patient is preparing for the Operation, to let the Cautery be heating in the Fire. After

The Application of Cauteries.

^a See ALBUCASIS, PARÆUS, ANDREAS A CRUCE, SCULTETUS, &c.

^b SCULTETUS *Obs. 72*. TULPIUS, *Lib. iii. Cap. 36*. DECKER, *Exercit. pag. 34*.

which, it will be necessary to secure the sound Parts from the Cautery, to prevent giving more than necessary Pain. For this Reason it is, that the fleshy Parts upon a carious Bone are first drawn and held aside by the Fingers of an Assistant, before the Cautery is applied. When the Instrument is sufficiently hot, it is to be applied and strongly compressed upon the disordered Part, till the Surgeon perceives the Bottom of the disordered Parts appear sound. To effect this the more speedily, it will be necessary to have several Cauteries in Readiness, that if one be insufficient, he may use a second or a third: Which Caution is more especially of Consequence to be observed in carious Bones and large Hæmorrhages.

The Use of
Cauteries in
Apoplexies.

IV. It may be here not amiss to take notice, that several Physicians have found by Experience, that Cauteries have succeeded in Apoplexies, when all other Remedies have failed. But for the Part to which the Cautery is to be applied, there are various Opinions. SCULTETUS, in *Obs.* 34. is for having it to be applied to the Occiput: But ZACUTUS LUSITANUS, and RIVERIUS, think it much better to cauterize between the first and second Vertebra of the Neck. Others again pitch upon the Meeting of the coronal and sagittal Suture: And Others prefer different Parts. MISTICHELLIUS, an *Italian* Writer upon the Apoplexy, asserts, that no Place can be so well pitched upon for Cauterizations in Apoplexies, as the Soles of the Feet. But the Manner in which the Soles of the Feet are to be cauterized in that Disorder, the forementioned Author has endeavoured to demonstrate in a particular Table, for which see *Tab. XII. Fig. 11.* where the Parts to be cauterized are signified by the Letters A A, the Cautery by the Letter B. Though that Instrument may doubtless be of another Figure than a square one. I tried this Practice upon a Person in an Apoplexy: But, instead of recovering, he died.

CHAP. XXIII.

Of BURNING with MOXA.

TO Cauterizations it may not be improper to join burning with Flax and *Moxa*, which latter is a kind of downy Substance, separated from the Leaves of a Sort of *Indian* Mugwort, and is used by the *Indian* Nations: But the first we find was used by HIPPOCRATES^a, and the other ancient Physicians, to cauterize Parts in Pain^a. Some of the Moderns wonderfully extolled Cauterization with *Moxa*, as the most effectual Means to cure, and wholly extirpate the Gout. But for the Art of cauterizing with it, it may be necessary to observe the following Particulars: (*viz.*) In the first Place, to make a small Cone of the Lint or *Moxa*, about a Thumb's Breadth long, (See *Tab. XII. A B*, at the Letter A and B) made much after the same Manner as they usually are for a Suffitus. The Basis of this Cone is to be stuck upon the Part with Gum Arabic, or Gum Tragacanth, and its Point is then to be fired by a Candle, or a burning Coal. By this means not only the Cone will be gradually consumed, but the painful Part will be at last by Degrees cauterised, and thence the Pains of the

^a *Lib. de Affect. Cap. 30.*

^b *CELSUS, Lib. iv. Cap. 23.*

Gout will frequently have some Remission. But if the Pains do not entirely vanish at the first, a new Cone is to be applied again to the Part, and the Cauterization thus continued till the Pain ceases. But, however this Process may have been cried up by many of the *Europeans*, it is at present quite in Disuse, and that not without Reason: For, besides the acute Pain which it causes, it is frequently found to have little or no Effect. But the *Chinese* and *Japonesse* have the Operation at this Time in the highest Esteem; insomuch that it, with their Acupuncturation, makes their chief Remedies.

These Cauterizations are said to be at present in use among the *Arabians*. More may be seen upon this Head in RHYNIUS *De Atribritide*, pag. 145. CLEYERUS in *Medicina Sinica*. PURMANNUS in *Chirurg. Pars III.* pag. 292. PECHLINUS in *Obs.* pag. 263. VALENTINI *Polychrest. Exotic.* pag. 197. and a particular Dissertation upon *Moxa*: And, lastly, KOEMPFER, in *Amœnit. Exotic.* pag. 589. and in his *Histor. Nat. Japon.*

C H A P. XXIV.

Of CAUSTIC and CORRODING MEDICINES.

I. CAUSTIC and Corroding Medicines, as they are called by our Surgeons, are those Medicines which being applied to Parts, consume, and, as it were, burn them like hot Irons: Whence the *Greeks* gave them the Names of *Caustics*; and CELSUS^a denominates them *Adurentia* and *Exedentia*. However they differ in this from actual Cauteries, that they perform their Effects slower and with less Force and Pain: Whereas in the Application actual Cauteries act instantaneously, and occasion most acute Pain. Potential Cauteries differ among themselves in various Degrees of Strength, according to their different Substance and Preparation: So that sometimes more, sometimes less, is applied to a Part for any Purpose. But among the various Kinds of potential Cauteries, the most considerable and effectual among us is the *Lapis Infernalis*, which is prepared *e Calc. Viv. & Cinerib. Clavellatis*, and which is applied for the opening Abscesses, as we have before mentioned (in *Part I. Book IV. Chap. III. N° XI.*) But there are some who prefer Lunar Caustic, or a Salt prepared from a Calcination of Soap-boilers Lees, or *Ol. Vitriol.* or a Solution of Mercury in *Aq. Fort.* Butter of Antimony, and a Mixture of Soap and Quick-lime; or, lastly, an arsenical or mercurial Sublimate, mixed with a little Honey. But it seems much safer to abstain from the arsenical and mercurial Sublimate, lest we should occasion those grievous Disorders and violent Pains, nay, even Convulsions and Death, which they sometimes produce^b. In what Manner potential Cauteries are to be applied for opening Abscesses, and making Issues, we have before declared in *Part I. Book IV. Chap. III. N° X.* also *Part II. Sect. I. Chap. XIX. N° IV.* for these Cauteries are said to be strong enough to remove Warts, Tubercles, Excrescences, Sarcomas, encysted Tumors, Wens, and schirrous Tumors, if they are properly applied either superficially, or to the Root, of the disordered Parts. By these an Hydrocele may be conveniently opened, and

The Use of
Caustics.

^a Lib. V. Cap. 7 & 8.

^b This HILDANUS mentions, *Cent. VI. Obs. 22, & 80.*

even a whole cancerous Breast may be removed. A considerable Instance of the Success of this Practice in *Germany*, we have from the celebrated SUTORIUS of *Norimberg*, afterwards Surgeon to the Duke of *Brunswick*. But great Caution is necessary in this Kind of Practice, not to irritate such Parts and Disorders by these Medicines, which, if they should prove inflexible, might endanger the Patient's Life. For thus a Schirrus may often be turned into a Cancer: And if they are applied to the Eyes or Eye-lids, they may hurt Vision, and may sometimes occasion profuse Hæmorrhages, if applied near large Veins and Arteries. Or, lastly, they may occasion Convulsions by injuring the Nerves: Though perhaps these are not all the bad Consequences that may attend an injudicious Use of potential Cauterics. But for the skilful Application of them, we shall give some Directions hereafter.

C H A P. XXV.

Of Opening ABSCESSSES.

THE Methods to be used for opening Abscesses, I think, have been already described in *Part I. Book IV. Chap. VIII. N° VIII.* Therefore to avoid Tautology, we shall refer our Reader thither.

C H A P. XXVI.

Of WARTS.

The various
Kinds of
Warts.

WARTS are commonly known to be small Excrescences of the Skin, seated in most Parts of the Body, but chiefly in the Hands and Face. Their Size and Figure are very various: Some are very broad and flat; some again are very tender, and others appear in Form of a Pear hanging by its Stalk. These are commonly removed more for the Deformity they occasion, especially in the Face, Neck, and Breasts of beautiful Women, than for any Pain or Danger. And, notwithstanding the great Variety of superstitious and insignificant Remedies which are sometimes used by the Populace, and even some Physicians, for the Removal of Warts, none of them are so expeditious and certain as the Means which come from the Surgeon.

Cure by Li-
gature.

II. To come therefore to the Purpose, we shall briefly deliver the chief Artifices used by Surgeons for the Removal of these Excrescences. And the first that offers is that by Ligature: Which consists chiefly in this, violently to bind a Horse-hair, or a Piece of fine Thread or Silk about the slender and depending Root of the Excrecence. By this Means the nutritious Vessels being compressed, and the usual Supply of Fluids being cut off, it gradually withers and decays.

Cure by Ex-
tirpation.

III. A second Method of removing these Excrescences is, by some sharp Instrument, to wit, by taking them up by a Pair of Pliers, and cutting them cautiously off with a Pair of Scissors. The Wound is to be dressed for some Time

Time with *Lap. infernalis*, or some other caustic Medicine, that if there be any of its Root remaining, out of which a fresh Tubercle might arise, it may be corroded and destroyed.

IV. But if the Excrecence is of the larger Kind, it is more adviseable to have Recourse to caustic Applications. But to make these act the more expeditiously, it may be proper to cut off the external and hardest Part of the Tubercle, either with a Scalpel, Razor, or Pair of sharp Scissors, and then to dress the Wound with Oil or Tartar *per deliquium*, or Spirit of Salt. But if these seem not strong enough for the Purpose, more vehement ones may be used; such as Spirit and Oil of Vitriol, *Aq. Fortis*, and Butter of Antimony. On the contrary, the softer and smaller Kind of Warts may be removed barely by wetting with the Juice of Celandine, or the Milk of Spurge. In the mean time, Care should be taken to prevent any of these Applications from getting into the Eyes, when they are used about the Eye-lids, which might blind the Patient. To prevent these Effects, it may be proper to circumscribe the Wart with a Ring of Wax, or a perforated Piece of Plaster, so that the Wart may come through; by which means the Wart only will be corroded, and the other Parts remain entire. By the same Methods other Tubercles and Spots, which deform a Person, may be removed.

V. A fourth Method of removing Warts, is by some actual Cautery, accommodated to the Size of the Excrecence, so that it may penetrate to its Root, when applied. (See *Plate III. Fig. 13, 14.*) Though there are many violent Means to extirpate Warts, none can equal that of the actual Cautery; which occasions most acute, though usually but a momentaneous Pain. The Part cauterized may be often dressed with *Basilicon*, or some other digestive Ointment and cooling Plaster, such as *de Sperm. Ranar.* This is the most certain Method of removing these Excrecences in whatever Part of the Body, the Eyes only excepted; for they never return.

VI. The fifth and last Method is that used by Mountebanks upon the Stage, which consists chiefly in anointing the Tubercle with some mollifying Ointment; after which they very violently pull it out by the Nails of their Fore-finger and Thumb. But as this Method of Cure is not very agreeable, so it is often found to be also ineffectual; for they generally return again from the Remainder of the Root.

VII. Lastly, we are here not to omit taking notice of some Warts which are livid and blue; which are usually seated in the Face, Lips, and about the Eyes, and are of a cancerous Disposition, much better left to themselves: For when they are irritated, they frequently degenerate into a Cancer, and miserably torment the Face, Eyes, and other Parts in which they are seated. You will find a remarkable Instance of this Kind of Warts in *SAVIARD's Observations, Obs. LXVIII. p. 296.* which, through an ill-judged Attempt of curing it, was attended with the most deplorable Symptoms, and destroyed the Patient.

C H A P. XXVII.

The Method of removing EXCRESCENCES, fleshy TUMORS, and MARKS from the MOTHER.

What an
Excrecence
is.

I. EVERY preternatural Tumor, which arises upon the Skin, and grows in the Form of a Wart or Tubercle, is called an Excrecence. They are by the *Greeks* called *Acrothymia*^a; and if they are born with a Person, as they frequently are, they are commonly called *Nævi Materni*, or Marks from the Mother. But if the Tumor is large, so as to depend from the Skin like a fleshy Mass, it is then usually called a *Sarcoma*. These Tumors arise in all Parts of the Body; more particularly in the Head, Face, Eyebrows, Neck, Breast, Abdomen, Anus, Legs, and Arms. But the worst of these Tumors are those, which arise in the private Parts. The Size and Figure of them are various, sometimes arising to a very considerable Bulk, which are described and figured variously by the Writers of Observations^b. With regard to their Colour, some resemble that of the Skin, others are inclined to black or red. And, lastly, with regard to their Figure, some are like Strawberries, Mulberries, Grapes, Figs, Pears, Mice, and various other Figures.

Their Re-
moval.

II. With regard to the Treatment of these, it is to be observed, that almost the same Artifices may here take Place as for the Removal of Warts, either by Ligature, the Knife, or actual and potential Cauteries, according as their different Sizes, Situations, Figures, the Patient's Habit of Body, his Will, and other Circumstances may require. For the rest, when any of these Excrecences have a very large Root, which the *Greeks* call *Mermixia*^c, or if there are large Arteries or Veins near its Root, or if it be firmly joined to any Bone, or have a Tendency to turn cancerous^d, the Surgeon should then remove them with Caution: Or, when there is great Danger, he ought wholly to neglect them, to prevent exposing his Patient to greater Dangers. When these Tumors are seated near large Veins and Arteries it is often proper to have Styptics, Bandages, and often actual Cauteries in Readiness to stop the Hæmorrhage, especially if they are removed by Abscission.

^a See CELSUS, *Book V. Ch. 28. N. 14.*

^b See SCULTETUS, *Arm. Chirurg. Plate XXV.* ELSHOLST, *History of the Cure of a Steatoma.* PECHLIN, *Obs. Med. Book III. 46.* BARTHOLIN, *Hist. Anat. Cent. 1, 23.* PURMAN, *Chirurg. Curios. p. 50, 134, and 370.* LAMESWERDE, in his Notes on SCULTETUS, has described many of a very remarkable Figure. The *English Philosoph. Transactions* give an Account of a very extraordinary Tumor of this Kind, that was taken off from the Cheek, weighing nineteen Pounds, *N. 354.* And the famous CULME has given a Description of a large *Stematomous Exostosis* in the Clavicle, with his Treatment of it; published at *Dantzick, 1732.*

^c CELSUS, *Book V.*

^d WEDELIUS saw a Case, where a *Nævus* turned cancerous on the Application of *Aquafortis.* *De Morb. Infant. p. 10.*

CHAP. XXVIII.

Of ENCYSTED TUMORS, and especially SCIRRHI, ATHEROMATA, STEATOMATA, MELICERES, and others.

I. **W**HEN Tumors that arise from different Parts of the Body are contained in certain membranous Coats, they are commonly called *Encysted Tumors*, being sometimes harder or sometimes softer, of a palish Colour, and usually attended with little or no Pain. These Kinds of Tumors arise almost in all Parts of the Body, from Obstructions, either in the Glands, or adipose Membrane; more especially in the Head, Face, and Neck, where they frequently occasion great Deformity: (See Plate XII. Fig. 13.) The membranous Coat with which they are invested, is often of a considerable Thickness, and is usually the Coat of the disordered Gland, or some of the adipose Cells. At their Beginning they are usually very small and moveable, being a considerable Time increasing by Degrees, till at last they sometimes arrive to an enormous and surprising Bulk. The Consistence of some of these Tumors is soft and fluctuating, of others more hard and consistent. The Figure of them is various, some being like Filberds, Acorns, Bullets, Wallnuts, and Eggs; others again like Pears suspended by a Sort of Stalk, like some of the fleshy Excrecences; some have a very large Root, and resemble ones Fist, Head, or other Figure. The Bulk of some of these Tumors has sometimes increased to that Degree as to weigh many Pounds^a: Others of these Tumors so firmly adhere to the adjacent Parts as to be wholly immoveable, and become of so hard a Consistence as to resemble a bony *Callus*; though many of them always remain soft and moveable. Several Kinds of these encysted Tumors are variously distinguished by their different Consistencies. When their Contents resemble Paste, they are then called *Atheromata*; if they are of the Consistence of Honey, they are termed *Melicerres*; but if they are of a fattish Consistency, like Suet or Lard^b, they then take the Name of *Steatomata*: If they happen in a Gland which becomes indurated, the Tumor is then called *Scirrhus*; and, lastly, when they are of a fleshy Consistence, they are termed *Sarcomata*. Some of these Tumors, as^c CELSUS has observed, have been found full of Hair. Again, these Tumors are variously distinguished and denominated from their different Situations: For when they are seated under the Scalp, they are called by the Name of *Talpa*, *Testudo*, or *Lupia*; when they are seated in the Neck, *Strumæ*, or *Scrophulæ*; but when they are situated in the Hands or Feet, especially near the Tendons of their Muscles, they are usually denominated *Ganglia*.

II. These Encysted Tumors are usually discoverable without much Difficulty by the Eye and Hand: But they are very difficultly discernable from other Tumors barely by their external Signs, if we do not discover their Difference by

Various
Kinds of en-
cysted Tu-
mors.

Diagnosis of
encysted Tu-
mors.

^a PETIT mentions one, that he extirpated, between the *Scapula*, of forty-eight Pounds Weight.

^b I have had some under my Care, that resembled curdled Milk, or new Cheese; for which there is no particular Name. For steatomatous Swellings in the Head consult ROOHNHUY'S, *Obs.* 17 and 20. A Cystic Tumor, that had many membranous Coats, is mentioned by MEKEN, *Obs.*

Append.

^c Lib. VII. Cap. 6.

feeling whether they are harder, softer, or more or less consistent. For as the external Skin receives little or no Alteration in its Colour in the several Sorts of these Tumors, we can therefore form little or no Judgment by it. Nor is it of any great Consequence to be acquainted with the Nature of the included Matter, except the Hardness, before we proceed to the Cure of these Tumors: For, whatever Matter they contain, the Manner of Treatment is pretty much the same. It is however to be observed, that *Scirrhi* or *Sarcomata* are the hardest of any of these Tumors; next to these come *Steatomata*; all the rest are still softer, and may require some Variation in their Treatment, according to their Degree of Consistence. Those Tumors seated in the Neck, which are called *Strumous* and *Scrophulous*, are commonly thought to be the Glands in the Neck indurated: But I have frequently observed *Steatomata* and other encysted Tumors in the adipose Parts of the Neck. For it seems scarce possible that those very small Glands which are situated in the Neck, should grow to such a stupendous Bulk as sometimes to hang over the Abdomen: Whereas those in the adipose Parts may easily do so. But besides these, there are also frequently lesser Tumors in the Neck, which seem to be those Glands indurated and much enlarged, being in Fact a Kind of *Scirrhi*.

Prognosis of
encysted
Tumors.

III. When encysted Tumors are without Pain, are neither too hard, nor too much enlarged, they presage no great Danger, inasmuch that it is common for poor People, and those who are afraid of the Surgeon's Hand, to bear them, to the End of their Lives, without any great Inconveniency. But when they grow too large, so as sometimes to weigh ten or twenty Pounds; when they cause violent Pains, as scirrhus Tumors frequently do; then, besides the intolerable Trouble they give the Patient, they also add great Deformity: And, if they are not timely removed, they often occasion a Consumption, or Cancer, putting the Patient in imminent Danger of his Life, as we before observed in the Chapter of *Scirrhus Tumors*. Every one must know, that, in the Treatment of these Tumors, for a Cure, the Assistance of the Knife is constantly to be called in: Because they will not easily digest, or be brought to Suppuration, as we have already observed in scirrhus Tumors. In the mean time, those Tumors are more safely and easily removed by the Knife, which are of no long standing, are soft, small, and moveable: Whereas those which are very large and hard, are attended with great Danger: especially if they are seated near to large Veins and Arteries, by Nerves, Tendons, or upon the Joints; or, if they happen in feeble and old People. Hence the Surgeon may judge from the Nature of the Tumor, and Circumstances of the Patient, whether or no, and by what Means, it is curable.

Cure by dis-
cussing.

IV. With regard to the Cure of these Tumors, various Methods are prosecuted. I am not insensible, that many Surgeons are for an immediate Extirpation of all encysted Tumors, without any more Delay: But I am rather inclined, with HIPPOCRATES, first, to try them with more gentle Methods of Cure. Whenever I meet with these Tumors, as yet soft, and of no long standing, I think it every Way more proper to disperse, or else to suppurate them, before the Knife is called in for Assistance. But on the contrary, when these Tumors appear to be very hard, and of long standing, it seems most proper to refrain from topical Remedies. For those Means are so far from succeeding in the Digestion or Discussion of scirrhus and steatomatous Tumors, that they
very

very often increase them, and sometimes turn them into a Cancer: Whereas they might have been tolerable in themselves for many Years, so that under these Circumstances we must rely altogether on Extirpation. But if the Patient is afraid of the Knife, and will admit no Means but topical Remedies, it may not be amiss to use some of the discutient or digestive Plasters; of which Sort are *de Ammoniaco, de Galbano, de Ranis cum Mercurio. Diachylon cum Mercurio, de Mellilot. Oxycroc. diaphoreticum MYNSICHTI, Diasapon, &c.* SCULTETUS (in *Obs.* 87.) assures us, he has cured various encysted Tumors of the *Melicer* kind with *Ceratum diasinapios*: But before a Plaster of that is applied, it is generally adviseable to anoint the Part first with *Bals. Peruv. Ol. Sapon. vel Petroleum, &c.* by which Means the Tumor frequently diminishes by Degrees, till it be at length dispersed. To do this the more effectually, a little mercurial Ointment should be well rubbed into the Tumor every Day before a Fire. See more concerning the Dispersion of schirrous Tumors in *Part I. Book IV. Chap. XVI.*

V. If the Tumor does not diminish by the Use of discutient Applications, you must endeavour to bring it to Suppuration^a: And this more especially when it is of the softer Kind, like the *Melicer* or *Atheroma*. For this Purpose the Application of a Plaster of *Diachylon* with the Gums, and the Repetition of warm emollient Cataplasms to the Tumor, are extremely useful: And the more so, if you moisten the middle of the Tumor every Day with a little strong *Sp. Salis Ammoniaci*. When the included Matter has thus acquired a due Softness, and the Integuments appear a good deal extenuated, you ought then to open the Tumor by a large Incision; and, having discharged the Matter with as much as you can of its including Cyst, the Remainder is to be brought away, by dressing with digestive or detergent Medicines. For if the Tunics of the Cyst be not entirely discharged, the Tumor generally returns again soon after the Wound has been healed. In the Time you are deterging the Abscess, it may be proper to apply a *Diachylon* Plaster externally, to keep the Lips moist, and better disposed to unite afterwards.

VI. But if the Tumor can be neither dispersed, nor suppured, but continues to enlarge itself, 'tis generally in that Case most adviseable to make an Extirpation of it, before it grows too large, or degenerates into a cancerous Nature. There are several Methods in Practice for removing or extirpating these Tumors, according to their Size and Nature. Those which are small and hard, or hang by a Root as by a Stalk, are generally best removed by Ligature, in the Manner of Warts: By which Means they wither, and fall off of themselves in a few Days. But the most ready and expeditious Method is, to cut them off with a Scalpel, and then to heal up the Wound: But if, in removing them this Way, you divide a considerable Artery, you may stop it by some potential, or even the actual Caustery, or else by taking it up with a Needle and Thread. Lastly, these Tumors may be often removed by the Application of caustic or corroding Medicines retained about the Root by means of Plasters, Compresses, and Bandage: And when you find the Root of the Tumor almost corroded through, the rest may be divided by the Scalpel.

VII. If the Root of the encysted Tumor appears too large for it to be conveniently taken off by Ligature, you must then remove it either by the Knife

^a See SCULTETUS on Suppuration in steatomatous Cases, *Obs. Chirurg.* 93.

or Caustics ; though the latter is usually preferred by most Surgeons. In order to extirpate it by the Knife, you must first make a longitudinal Incision upon the Tumor : And if that does not appear sufficient, make another Incision across the former, till you think the Wound large enough for taking out the Tumor. In order to this you next dilate the Integuments, and separate them from the Cyst of the Tumor, by the Assistance of your Fingers and the Scalpel, by which Means you are to take it out whole, if possible. That you may succeed the better in the Operation, it will be proper for an Assistant to dilate the Lips of the Wound, either with Hooks or his Fingers, and to wipe up the Blood as it flows, with a Sponge, that the Surgeon may not be impeded in his Work. When the Tunic, or Cyst of the Tumor appears, which is usually pretty white and hard, the Surgeon is then to take hold of, and elevate the Tumor with the Fingers of his Left Hand, if it be small enough : But if it be too large to be thus held and elevated, it may be done by another Assistant with the Hook, *Tab. VIII.* or the Forceps, *Tab. XXIII. Fig. 1.* or else he may pass a crooked Needle and strong Thread cross-wise under the Tumor, and by that Means elevate it, while he circumspectly frees it from the adjacent Parts ; which is generally done with most Ease in the moveable Kind of these Tumors : But in the more fixed, the Task is pretty difficult. But in thus freeing the Tumor, the Surgeon must be cautious not to injure any important Part that may be contiguous : And if the Tumor, to be extirpated, is either in the upper or lower Extremities, where perhaps a large Artery or Vein is to be divided, in that Case the Tourniquet may, and even ought to be first fixed upon the Limb. Which Circumstances being duly observed, Tumors of this Nature have been often successfully extirpated, of many Pounds Weight, and which have been not only lodged in the fleshy Parts, but have even adhered to the Bones and Jaws^a.

Treatment
after Ex-
traction.

VIII. The Tumor being thus carefully extracted, if the Wound and Hæmorrhage be small, you may press the Lips together with your Fingers ; and by covering the same with Lint and Compresses, retained with a proper Bandage, the Patient is generally cured in a few Days time. But in Case of a profuse Hæmorrhage, the Blood is to be stopped, either by Ligature, Astringents, or the actual or potential Caustery, as we have directed more at large in *Part I. Book I. Chap. II.*

Removal of
Fragments
of the Cyst.

IX. But if by Neglect or Accident the including Cyst of the Tumor should be broke or wounded in its Extraction, (or industriously, to save the Eye, where it falls on the Eyebrow ; or to secure the Veins and Arteries in other Parts of the Body) Care must be afterwards taken entirely to remove it ; otherwise the Tumor will speedily return. Indeed if the Tumor be either a *Schirrhus*, *Sarcoma*, *Steatoma*, or a glandular Part, the Contents are hard enough to make a clean Extirpation of it, notwithstanding its including Coats be wounded. But when the Matter of the Tumor is soft or fluid, by its escaping, the Tumor will become flaccid, so that it will be hardly possible to make a clean Extirpation of the Cyst without leaving some Fragments behind ; which must, in that Case, be brought away, by dressing the Abscess with Digestives, and deterging with *Præcipitat. rub. Alumen ust. Ung. Ægyptiac. &c.* mixed with your digestive

^a See ROONHUYSEN, *Obs. I.* pag. 4. SCULTETUS *cum notis* TILINGII, PECHLIN, *Obs.* pag. 542. PETIT *apud* GARENGEOT. *Chirurg.* Tom. II. Cap. de Tumor. Tunicat. LE DRAN, &c.

Ointments: By which means, having cleared the Sinus, you may incarn and heal, as in other Wounds, without the Danger of a Relapse.

X. If you rather chuse to remove Tumors of this Kind by the Use of Caustics, you must, in that Case, apply a Piece of *Lapis infernalis*, *Butyr. Antimon.* &c. upon it, defending the other Parts by a perforated Plaster, as we directed Chap. XIX. Sect. IV. But, in my Opinion, this is not a safe Practice in those encysted Tumors, which are hard, large, inveterate, and painful, or inclining to be cancerous; for thus you may easily turn a *Scirrhus* into a real Cancer: And even in others, 'tis hardly possible thus to erode them quite away without inducing violent Pains, Fever, Hæmorrhage, and other malignant Symptoms, to the Hazard of the Patient's Life. It is therefore, in the general, much better to have Recourse to the Knife for the Removal of these Tumors, when they are large and hard, notwithstanding we now and then meet with an Instance of their being successfully extirpated by Caustics*. But if the Tumor appear soft, and yielding, like the *Atheroma* or *Meliceris*, in that Case, I frequently apply a Caustic, so as to make a Way through the Integuments, and Cyst: Or else dividing them by an Incision in the Middle, I discharge their Contents, and then deterge and incarn, as in other Abscesses; which last Method I take to be milder than an Incision, and Extirpation of the Cyst by the Scalpel. See LE DRAN on the Treatment of a *Meliceris* above the Knee.

Use of Caustics in these Tumors.

C H A P. XXIX.

The Method of extracting foreign BODIES from WOUNDS.

I. **W**E meet with very little in the antient Systems of Physic and Surgery concerning the Extraction of Bullets, which may possibly be, in some Measure, owing to their not being so much in Use, or at least not so fatal formerly as now. We indeed read in CELSUS^b, that leaden Balls were used by Soldiers in War before the Birth of CHRIST: But then I suppose they were only flung by Slings or Bows, the destructive Powder being at that Time unknown. For the same Reason we also meet with no Directions for extracting Fragments of Bomb or Granade Shells, which are of a later Invention: But then they are more large in the Methods of removing the Ends of Darts, Spikes, Arrows, Swords, and such like Weapons. And though, at this Time of Day, Arrows are hardly ever used but among barbarous Nations, yet it may not be here improper to give brief Directions for their Extraction, if they should chance to come under the Surgeon's Care. In doing this, we shall find that almost the whole Business consists in drawing out the Head, so as that its protuberant Beard or Hooks may not wound and lacerate the contiguous Parts. If it appears to be lodged but superficially under the Integuments, it will be best to draw it out the same Way it entered, provided you first dilate the Wound sufficiently by Incision, rather than give Occasion for any of the adjacent Parts to be lacerated: Otherwise it may be thrust forwards, and drawn out in the Di-

* Of extirpating scirrhus Tumors in the salival Glands, and those of the Neck and Breast, we shall treat hereafter in particular Chapters.

^b Lib. VII. Cap. 5.

rection of its Point in the opposite Side, having first made an Incision to meet it. This last Method is most eligible, when the Weapon has descended very deep, so that there is much less Space for it to pass onward, than to be drawn back again; and also when it has passed beyond any large Blood-vessels, or Nerves, so that it would induce a Laceration of them, to draw it back: And therefore, to avoid them, it must be thrust forward through an Incision made in the nearest and most convenient Part of the opposite Side. The Method of extracting the Ends of Spikes, Swords, Sticks, or the Fragments of Glass, Paper, Clothes, &c. you may find in *Part I. Book I. Chap. I. Sect. XXXIII.* and, in the third Chapter following, you will find the Method of extracting Bullets and Grains of Gun-powder, in Gunshot-wounds. Lastly, if any of these foreign Bodies have ruptured a large Blood-vessel in the upper or lower Extremities, so as to excite a profuse and dangerous Hæmorrhage, it will, in that Case, be immediately necessary to apply the Tourniquet upon a convenient Part of the Limb, before you search for the Body; which being extracted, the next Step is to secure the ruptured Vessel, and dress the Wound.

CHAP. XXX.

Of SUTURES of WOUNDS.

The Kinds
and Uses of
Sutures.

I. **T**HERE are two Kinds of Sutures used by Surgeons in Wounds: The first is made with a Needle, and distinguished by the Name of the *true* and *bloody Suture*; the other is made by the Application of sticking Plasters, and is termed the *dry* or *false Suture*. Sutures are not to be used indifferently in all Wounds: But in those chiefly, in which the Lips cannot be closely approximated by Deligation: As in many of the transverse, oblique, or angular Wounds, which have been lately inflicted, are quite free from any foreign Bodies, and are not attended with any Loss of Substance. In most of these a Suture will be of great Service, not only by expediting the Healing, or Union of the Wound, but also by procuring a smaller and neater Cicatrix. The dry Suture is used chiefly in such Wounds as are superficial, of no great Depth or Length, and particularly for those inflicted on the Face. Though even in these there are some Surgeons, who prefer and make the true Suture. But I think the different Circumstances and Dispositions of Wounds may very well direct the Surgeon, sometimes to one, and sometimes to the other Kind of Suture: For what need is there of stitching up a Wound, whose Lips may be well approximated, and retained together by Plaster and Bandage? I think the Needle ought, in such Cases, to be spared, both for the Ease of yourself, and the Patient. But on the contrary, in large and deep Wounds, where the Lips cannot be closely retained by Plaster and Bandage, or in those where the Part is almost amputated, or hangs by a little bit, as in the Nose, Ears, Cheeks, Chin, Forehead, Fingers, &c. there you ought immediately to conjoin the Lips by Suture with Needle and Thread.

Directions
for Sutures.

II. As we have already sufficiently explained the Method of making Sutures in Wounds (in *Part I. Book I. Chap. I. Sect. XXXIX. & seq.*) we shall here only add a few necessary Cautions: As, 1. That you ought always to shave the Hair

of

of the Part clean off, with a Razor, before you attempt to conjoin the Lips of the Wound by dry Suture, with sticking Plasters. 2. That when one Plaster does not well retain the Lips, you must apply several, either by the Side of, or across each other, as in *Tab. IV. Fig. 4, 5, 6.* You are also to observe, 3. That the true Suture with Needle and Thread is of two Kinds, Simple and Compound: The first of which comprehends the *knotted*, the *Glovers*, and *circumvolved*, and the Suture of the Tendons. And, among these, the first is so called from its distinct Knots, *Tab. IV. Fig. 16.* the Glovers from its Resemblance to the Suture used by these Artists, and by the Surgeon for Wounds of the Intestines, *Tab. IV. Fig. 20.* The circumvolved Suture is, when the Thread is wound about the Needle, after it has been entered through both Lips of the Wound, as in *Tab. IV. Fig. 21, 22.* for the Hare-Lip: In treating of which we shall describe it more particularly. The Suture of a Tendon is also of a particular Kind, as we shall describe in our Chapter of uniting divided Tendons, by this Means, in the End of our Operations. Besides these now mentioned, there were various other Sutures used by the antient Surgeons, as the *Sutura Sartoria*, *Sutura Celsiana*, & *Clavata*, the last being made upon Quills or cylindrical Sticks, as in *Tab. IV. Fig. 19.* But we shall not insist upon a particular Description of these, which have been long out of Use: Only we may observe, that the *Sutura clavata* has been lately revived, and recommended with a little Variation, by PALFYN and GARENGEOT; who, instead of Sticks or Quills, use a bit of Silk spread with Cerate, and rolled up into a Cylinder: 4. Lastly, you must observe, that, in the Suture of deep Wounds, it is frequently necessary to introduce a Tent, and leave it at the Bottom of the Wound, till its Fundus appears well deterged, that you may heal it from the Bottom upwards.

C H A P. XXXI.

Of separating ADHESIONS betwixt the FINGERS and TOES.

I. **W**E frequently meet with new-born Infants, having several of their ^{Adhesions of the Fingers together.} Fingers or Toes cohering, or grown together, either by a strict Adhesion of their Flesh, or else only by loose Productions of the Skin, as in the Feet of Ducks and Geese. Though the same Disorder is also sometimes found in Adults, when their Fingers or Toes have been neglected, after an Excoriation of them in Burns or Wounds: To be freed from which Malady, the Patient is desirous of invoking the Surgeon's Aid, partly to be rid of the Deformity, but chiefly to recover the proper Use of the Fingers. These Adhesions may be separated in a two-fold Manner, according to the Nature of the Disorder, *i. e.* either by cutting out the intermediate Skin with a Scalpel, or Pair of Scissors, or else barely by dividing them from each other with those Instruments when they closely adhere. But to prevent their Cohesion again for the future, you must invest each of the Fingers separately with a spiral Bandage about an Inch broad, and dipt in *Aq. Calcis cum Sp. Vini*, according to the Figure in our last, or, XXXIXth Plate, on Bandages.

H. Some-

Of AMPUTATING *superfluous* FINGERS. Part II.

II. Sometimes the Fingers, instead of adhering to each other, grow to the Palm of the Hand, as I have more than once observed from Wounds or Burns; so that they cannot by any means be extended, or drawn back to open the Hand. For the Sake of Beginners, I shall recite the Method, by which I cured three of these Patients. First, I carefully separated the Fingers from their Adhesions with the Palm, without injuring their Tendons, and, after dressing them with vulnerary Balsam, and scraped Lint, I extended them on a Ferula of thick Pasteboard, in which extended Posture I treated the wounded Fingers separately, till they were healed. But at every Dressing you ought to move the Fingers gently, to prevent a Rigidity, or Stiffness of their Joints.

CHAP. XXXII.

Of amputating DISEASED and SUPERFLUOUS FINGERS.

INFANTS are sometimes born with supernumerary, mis-shapen, and misplaced Fingers, of various Kinds, some with Nails and Bones, and others without, resembling fleshy Excrescences. When the Deformity or Incumbrance of these make their Amputation necessary, it may be conveniently enough performed, either by the Scalpel, or a Pair of Scissors; especially when there are no Bones in them: For if there are Bones, you must amputate with a stronger Pair of Scissors for the Purpose, able to cut through the Bones. If there are several of these Fingers, and the Infant appears too weak or infirm, to have them all amputated at one Time, it is best to take them off at separate and convenient Intervals, intermitting a few Days, so as to amputate the next, when the preceding is near well. The Hæmorrhage may be stopped with dry Lint and Compresses, or such as have been dipt in *Sp. Vini*, and the Wound next healed with some vulnerary Balsam, as in others. In the Year 1718, I cured an Infant of three Weeks old, after taking off a superfluous long Finger, which grew to the Thumb, which had a long Bone, and a Sort of Spur like that of a Cock, instead of a Nail; see *Tab. XII. Fig. 15*. I proceeded, first, by making an Incision through the Skin all round it with a Scalpel, and then cut through the Bone with a strong Pair of Scissors. This done, I stopt the Hæmorrhage, which was inconsiderable, with Lint dipt in *Sp. Vini*, and a close Bandage; and the Wound was afterwards speedily healed with vulnerary Balsam. I could recite many more Cures of the same Kind made by myself: But as the Method used was the same in all, they are not here necessary to be mentioned, since this alone will suffice.

C H A P. XXXIII.

Of amputating sphacelated FINGERS and TOES.

I. FINGERS and Toes are usually amputated by the Surgeon, chiefly ^{When it is necessary to amputate Fingers and Toes.} upon three Accounts; 1. When they are so contused and shattered by Bullets or other Instruments, that they cannot be restored and preserved: 2. When they are sphacelated, or totally mortified, either from Cold, Contusions, or other Causes: And, lastly, 3. When they become carious, cancerous, or schirrhous, so as to be curable by no Remedies or Applications whatever, as I have met with frequent Instances. Nor is it uncommon for the Fingers of Masons, Carpenters, and other Labourers, to be accidentally crushed, so as to make an Amputation of them unavoidable. See ROONHUYSE, *Obs. Chirurg.* 25.

II. Before the Surgeon proceeds to amputate Fingers or Toes, he ought to be first well assured, that there is no Possibility of preserving them sound and entire. ^{Cautions to be first observed.} Therefore if they appear to be but slightly crushed, or only beginning to be infested with a Gangrene, he ought to treat them with discutient and spirituous Applications, to prevent the Disorder from spreading itself; at the same time reducing and retaining the bony Fragment by his Fingers, and Deligation, as in other Fractures. But if they are so violently crushed as to hang but by a little bit, I know no great Reason why they should not be immediately taken off, either by the Scissors or Scalpel; as they also should when any one Joint is completely sphacelated; for Delays are, in those Cases, frequently very dangerous. But if any of the Fingers or Toes should be cut off by any sharp Instrument, so as to hang by a bit, the Wound being recent, though large, you ought not to take off the pendulous Part, but replace it immediately, securing it well by Plaster and Deligation, and this even when the Part is cut quite off, but obliquely. For I knew an Instance of a Butcher's Finger that was cut quite off obliquely, but being immediately fixed, and retained in its proper Place by Deligation with a Linen-rag, it adhered, and became well without any other Medicines. At least, it is always best to try, if it will not adhere before you cut it off, and reject it; see *Chap. LXXII.* following.

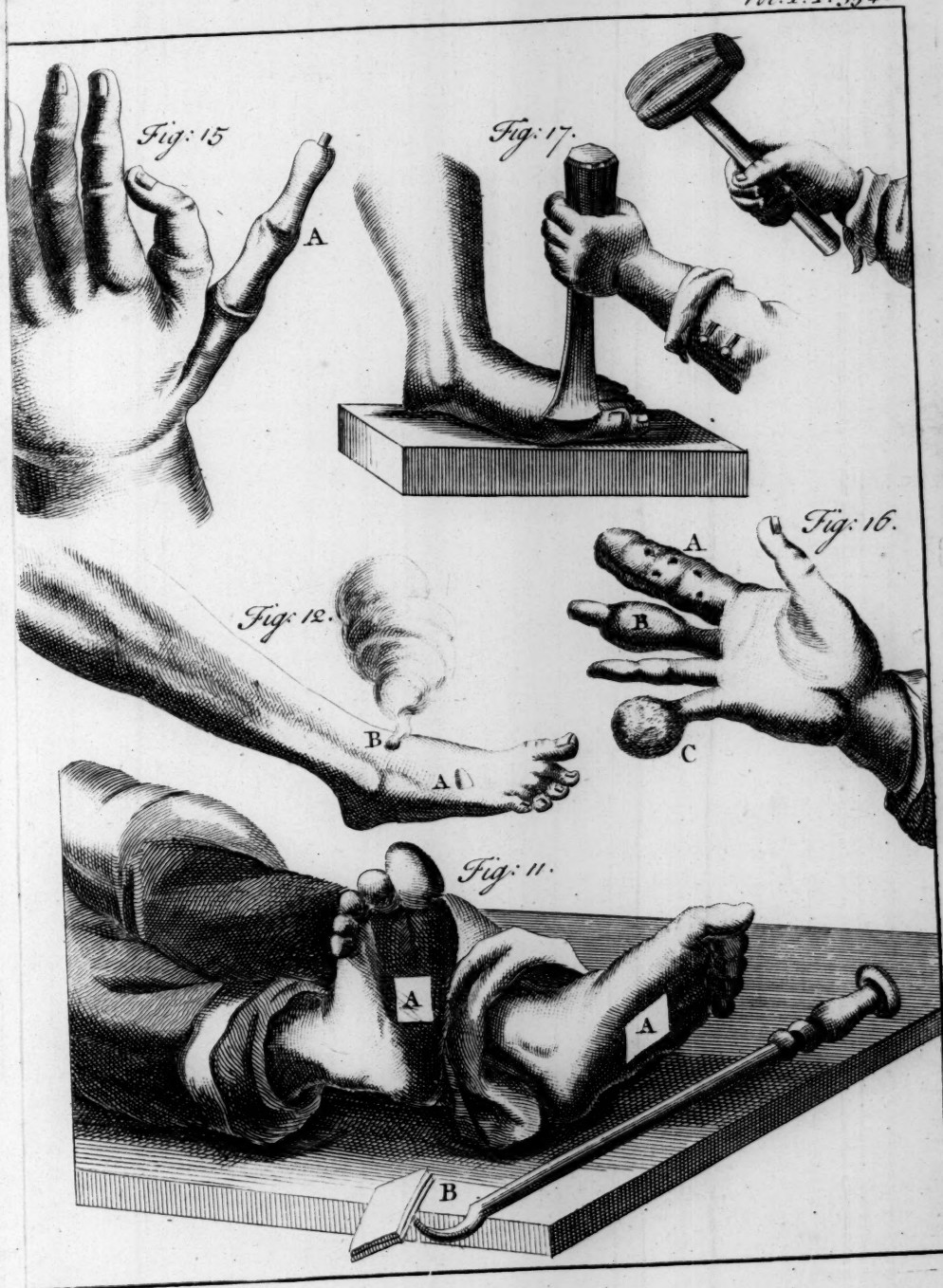
III. The Manner of amputating is chiefly threefold: Either 1. by a Pair of strong Scissors^a, or rather sharp-edged Pincers, treating the Wound as we before ^{Method of amputating.} directed in the preceding Chapter: Or, 2. by the Mallet and Chisel, *Tab. XII. Fig. 17.* with which the vitiated Parts are taken off at one Blow, as I have frequently done in cancerous Affections with a Caries or *Spina Ventosa* in the Fingers: And ROONHUYSE has also thus successfully amputated the great Toe, being scirrhous, notwithstanding what others may say against this Method. Or, lastly, 3. the diseased or mortified Parts are amputated by dividing in the next sound Joint with a Scalpel, leaving or drawing back a large Part of the Skin, to

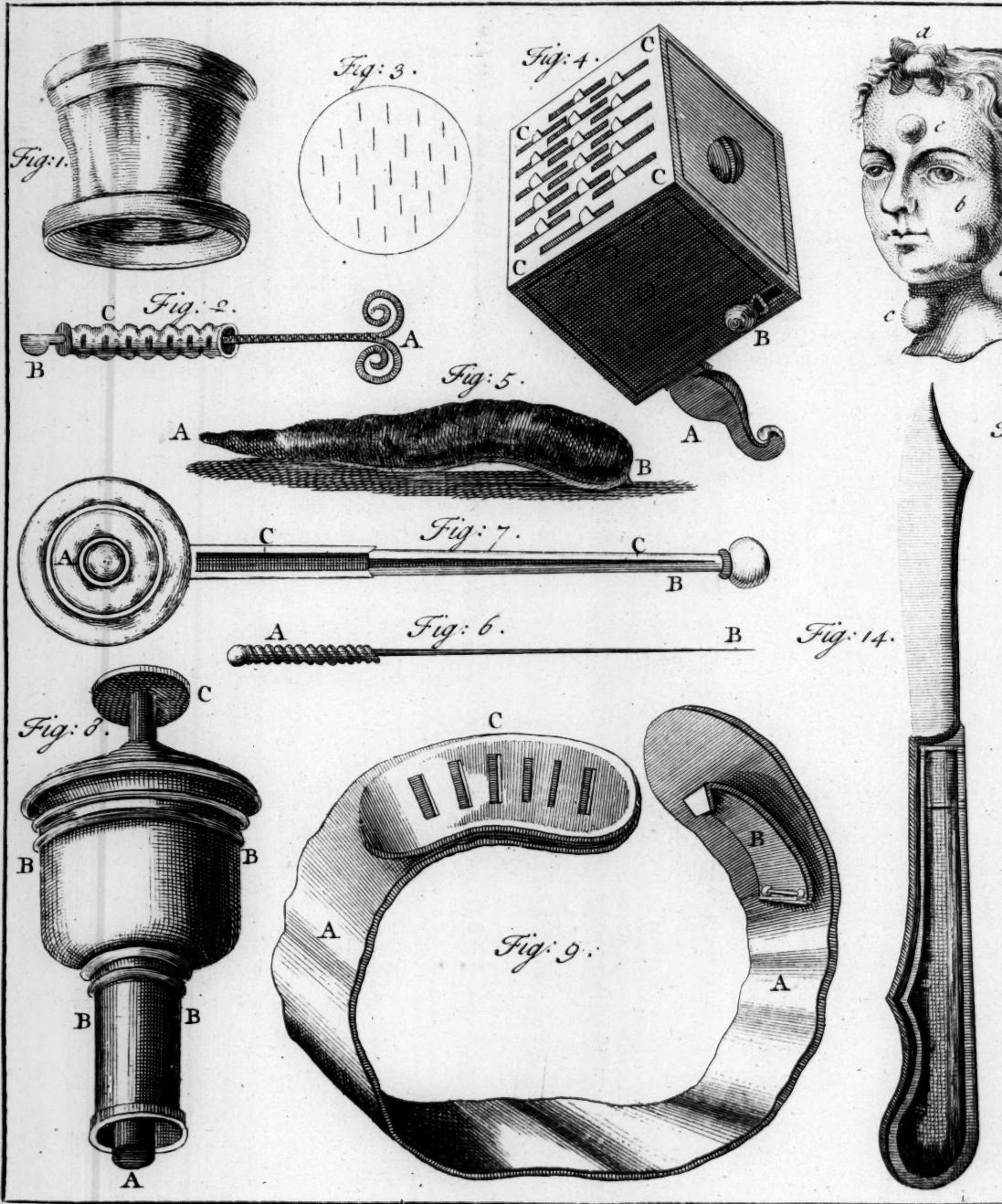
^a See PARÆUS, *Book XVI. Ch. 30.* SCULTETUS *Plate LIII. Fig. 2.* But by this Method the Bones are often splintered, or the nervous Parts lacerated; from whence arise dangerous Inflammations and Abscesses, and too frequently a Caries is the Consequence. DOUGLAS absolutely rejects the Forceps, the Mallet and Chisel, *Operat. Chirurg. Syllab. p. 45.*

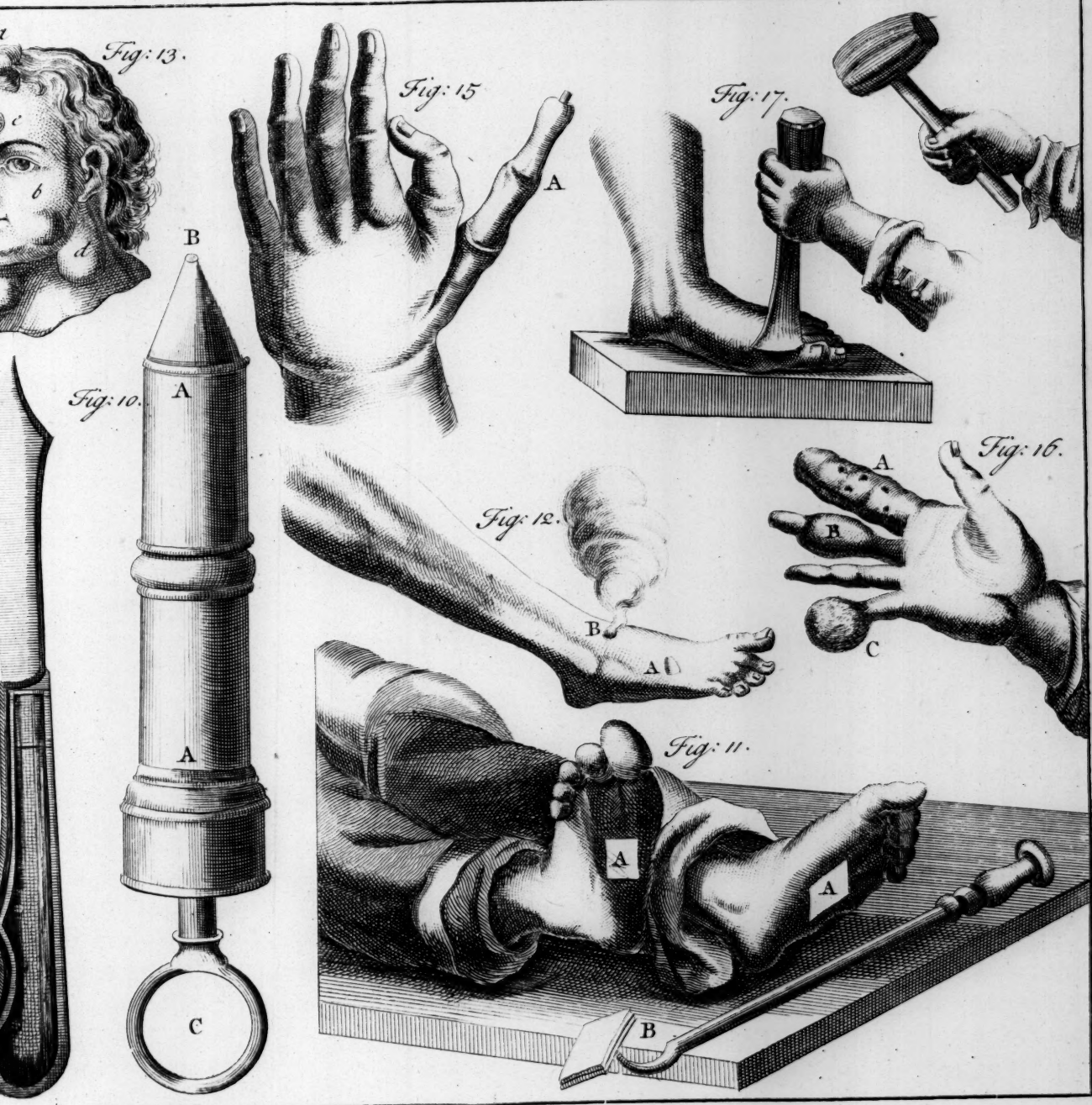
wrap over the Stump, that it may heal the sooner. This last Method of amputating, is preferable to the former, in that you are, by this means, certain to avoid any supervening Caries, or a splintering of the Bone: For which Reasons I have used it with Success for removing Thumbs and Fingers, even of old People, in the Articulation of them with the Metacarpus, when they have been totally destroyed by a Caries or Mortification. Some indeed imagine this Method of amputating in the Joint to be not so convenient, because a Cicatrix or Skin cannot be induced over the Cartilage. This is, however, an Obstacle that I never yet met with, and may, at worst, be easily avoided by drawing back and leaving a large Part of the sound Skin on, and by removing the cartilaginous Extremity of the metacarpal or metatarsal Bone; by which means the Bone and Skin will more intimately unite and adhere. After the Amputation your Dressings must be made with scraped Lint, Compress, and Bandage, as we before directed. And, if the Patient be plethoric, in order to prevent Inflammation, or a future Hæmorrhage, it may be proper to take a few Ounces of Blood from a Vein. If any of the two foremost Internodes of the Fingers, should appear to be carious, and Part of the third, it is better to amputate the vitiated Part of the last by the Mallet and Chisel, which will more expedite the Cure, than to take off the whole Finger close to the Metacarpus by the Scalpel. But if the whole Finger or Toe is entirely corrupted, it must then be taken off in the Articulation close to the Metacarpus, leaving a good deal of the Skin. See Instances of great Toes amputated in LE DRAN, *Obs.* 112, 113, and 114.

An EXPLANATION of the TWELFTH PLATE.

- Fig. 1.* Represents the Cupping-glass used at present in Germany, and elsewhere, for dry Cupping, or for extracting Blood after Scarification.
- Fig. 2.* Is the Scalpel, or Scarificator, commonly used by our German Cuppers. A the Handle, B the Edge, C the Part which is struck extremely quick by the Finger, so as to make the Edge wound the Skin.
- Fig. 3.* Represents the Order or Position of the little Incisions made in the Skin by the Cupper, that they may all be cleanly covered by the Cupping-glass, *Fig. 1.*
- Fig. 4.* Exhibits the modern cubical Scarificator, making sixteen Incisions in the Order of *Fig. 3.* by one Stroke upon the Skin, and with very little Pain.
- Fig. 5.* Gives the Form or Shape of a Leech, for the Information of such as may be ignorant of that Insect: A the Mouth or Head by which it bites, B the Body and posterior Parts. But it must be observed, that one and the same Leech may, by differently contracting and expanding itself, appear in a hundred Shapes, so that its Length and Thickness are very uncertain.
- Fig. 6.* Is the Needle used by the Inhabitants of China and Japan for making their Acupuncturation, which they celebrate in most Disorders, as we do Phlebotomy. A the Handle, B the Point which enters the Flesh.
- Fig. 7.* Is the little Hammer used to strike in the preceding Needle: A the Head of this Hammer, B its Handle, CC a Case in the latter to deposite the Needle in.
- Fig. 8.* Represents the actual and concealed Cautery, used formerly for the making of Issues, and is, by some, denominated *Capsula Casseriana*. A denotes the End of the actual Cautery, or red-hot Iron, protruding itself beyond







yond the Case. B B is the wooden Case concealing the red-hot Iron from terrifying the Patient. C the Handle, by depressing which, the Cautery is forced into the Skin.

Fig. 9. Is a Machine to be used instead of Deligation for Issues in the Arm, to be made a little longer for those in the Neck, Leg, or Thigh. A A is a leathern Swath of about two or three Fingers Breadth. C C is a Brass-plate with several oblong Appertures, for intercepting the Hook B of the other Plate in the Manner of a Clasp.

Fig. 10. Shews the Syringe proper for injecting Liquors into the Urethra of Males, and the Vagina of Females, for various Uses. A A the Body of the Syringe, B its Extremity, ending with an obtuse Point instead of a small Tube, to prevent the injected Liquor from regurgitating and flying about. C the Ring or Handle of the Sucker, by which the Liquor is drawn into, and forced out of of the cylindric Body.

Fig. 11. A A Shews the Parts of the Soles of the Feet, which the *Italian Physician MISTICHELLIUS* directs to be cauterized in Apoplexies, B the Square Iron Cautery for the Operation, which in that Disorder, he says, is highly serviceable.

Fig. 12. Represents the Method of burning the Part affected in the Gout with the *Indian Moxa*. A denotes the Cone of *Moxa* not yet fired, and B one that is burning.

Fig. 13. Gives a View of several encysted Tumors *a b*; of schirrhous Glands in the Neck *c d*; and of a fleshy Excrescence or Mark from the Mother, *e*.

Fig. 14. Represents the small Scalpel, which I generally use for extirpating schirrhous Tumors, or Glands in the Neck, Wens, or even schirrhous Glands of the Breasts.

Fig. 15. Represents the Hand of an Infant with six Fingers: In which A denotes the superfluous Finger with a Nail like a Cock's Spur, which I took off by a Pair of amputating Scissars or Pincers. This Instrument I also use in a *Spina ventosa*, or Caries of the Fingers.

Fig. 16. Is a Hand with a whole Index, A, carious, which I amputate close to the Metacarpus by the Scalpel Fig. 14. But then I also remove the Head of the first Phalanx, that the Wound may heal the sooner. B denotes a *Spina ventosa* in the middle Finger, and in the second Internode, which I amputate in the first Bone or Phalanx; C is a large Excrescence or Protuberance at the End of the little Finger, from the same Disorder, which I amputate in the second Bone, both of them by the Mallet and Chissel.

Fig. 17. Shews the Method of amputating the great Toe with the Mallet and Chissel, used by ROONHUYSE.

C H A P. XXXIV.

Of amputating the HAND, CUBITUS, and HUMERUS.

I. **T**HOUGH the Amputation of Arms and Legs is indeed, with some Reason, commonly esteemed one of the most terrible and severe Operations in Surgery, yet there are many Cases that occur daily in Practice, in which

In what Cases Amputation is necessary.

the Operation is absolutely necessary and unavoidable, in order to save the Life of the Patient. Such as, 1. When the Muscles of the Part or Limb are sphacelated^a; 2. Or when the Muscles and Bones are most violently contused and shattered; 3. When there is an incurable Caries, or *Spina ventosa*^b; 4. When the brachial, crural, or other large Artery, is either totally divided^c, or else wounded, so as to bleed incessantly without any Possibility of stopping the Hæmorrhage but by Ligature; in which Case 'tis hardly possible to preserve the Limb from mortifying, or save the Patient's Life without Amputation. 5. And, lastly, this Operation is necessary in those Tumors of the Hand and Arm, which arise from a *Spina ventosa*, or some other irremediable Cause, the Patient being tortured with the most excruciating Pains, as described by M. A. SEVERINUS^d, BIDLOE^e, RUYSCH^f, &c. In the mean time I would advise all prudent Surgeons, not to perform this Operation without there are other skilful Surgeons or Physicians, who also advise it, or think it necessary; by which means he may avoid many reflections, which are often unjustly thrown upon a Surgeon without such Precaution.

Method of
amputating
the Hand,

II. To proceed regularly with Amputations in the upper Extremities, we shall begin with that of the Hand; which may, on some Occasions, be amputated, in the Manner of the antient Surgeons, by one Blow with the Mallet upon a sharp Chissel fixed near the Carpus, as the Operation is represented in *Tab. LIII. of SCULTETUS, Edit. An. 1666.* But in reality this Method is often found to be not only unsafe, but even of dangerous Consequence, by violently contusing or fracturing some of the Bones and Parts in the Carpus. It is therefore not without Reason that the Moderns reject this Practice for that with the Knife and Saw; with which they take off the Hand more slowly indeed, but more securely, provided the Saw be not used to the Carpus or Metacarpus: Because the numerous Ligaments, Tendons, and small Bones there seated, cannot safely be divided by the rough Teeth of that Instrument. ^g The Practice of the modern Surgeons is therefore here much the best, who amputate the Hand by the Knife and Saw, cutting through the Bones of the Cubitus, as will presently appear.

What is to
be observed
in amputa-
ting the
Arm,

III. When the Hand, Cubitus, or Humerus, are required to be amputated upon the Account of some incurable Sphacelus, Caries, or other Disorder, there are then two Things chiefly necessary to be observed. The first of these is the *Place where* the Amputation must be made, which must at least be one^h or two Fingers Breadth above the mortified Part, never in the diseased Part it-

^a See Part I. Book IV. Chap. XIV. preceding.

^b See Part I. Book V. Chap. VIII, IX. preceding.

^c I have frequently stopped profuse Hæmorrhages from the brachial Artery by Ligature, and therefore it will not be so often necessary to amputate the Arm on that Account, as many Surgeons imagine and direct.

^d *Lib. de Abscess.*

^e *Exercit. Medic. Chirurg.*

^f *Epist. Anatom. Problem XIV.*

^g Yet there have been some Surgeons who have, in this Manner, amputated the Hand by the Saw in the Carpus or Metacarpus, as we learn from SCULTETUS, *loc. cit.* Nor is it impracticable, in my Opinion, to amputate the Hand in its Articulation with the Cubitus by the Scalpel, as in the preceding Chapter; though I must acknowledge myself to have never yet made the Experiment.

^h FABRICIUS AB AQUAPEND. L. I. *Pentateuch. Chirurg. & Operation Chirurg. tit. de Sphacelo*, & SCULTETUS in *Explic. Tab. LIII.* are both of Opinion, in Opposition to HILDANUS, that the sphacelated Limb should be taken off in the diseased Part, near the sound; and what remains unsound, self.

self. Nor ought these larger Kinds of Amputations to be ever made in the Articulations: For (besides other Difficulties) there being no Flesh there to cover the Ends of the Bones, it will be almost impossible to heal the Stumpⁱ, or prevent a Caries in the Head of the Bone, with other bad Symptoms. The next Thing required after the proper Place for Amputation is assigned, according to the usual Method, is (2.) *the Provision and Preparation of the several necessary Instruments and Parts of the Apparatus*, which are to be laid in readiness upon a large Plate, or convenient Part of the Table; yet so as that they may be concealed from the Patient's View, who might be not a little terrified and disheartened by them.

IV. For the Sake of Beginners, we shall here enumerate the several Instruments The Instruments and Apparatus required. necessary to compose the Apparatus for this Operation. These are, (1.) the *Tourniquet*, before described in *Part I. Book II. Chap. II. Sect. IX. & seq.* (2.) Some Ligatures, or Tapes, of a Finger's Breadth, and about an Ell and a half long. (3.) A middling-sized Knife (*Tab. XIII. Fig. 1.*) for dividing the Skin, to draw it back. (4.) A larger Scalpel, or Knife, of a crooked Figure (*Tab. XIII. Fig. 2.*) for dividing the Remainder of the Flesh. (5.) A Catlin, or double-edged Scalpel (*Fig. 3.*) for dividing the intermediate Flesh betwixt the Ulna and Radius. (6.) A Piece of Linen Cloth about three Spans long, and six Fingers Breadth, slit up lengthwise about half-way, as in *Tab. II. Fig. 17.* (7.) A well-tempered and sharp Saw^k (*Tab. III. Fig. 4.*) for dividing the Bones. (8.) A Pair of Pliers, or Forceps to hold the Ends of the Arteries, (*Fig. 5 and 6.*) (9.) Some crooked Needles, armed with strong Thread, or some Bits of blue Vitriol wrapped up in Lint or Cotton. (10.) Some small square Compresses, (*Tab. II. Fig. 21.*) (11.) A large Quantity of scraped Lint. (12.) Some astringent Powders, to stop the Hæmorrhage, or rather, as the former frequently inflames the Parts and impedes the Suppuration, provide some *Alcohol Vini & Oleum Terebinthinæ*, in proper Vessels, though in reality we may well enough omit all of them. (13.) A large Bolster of fine Tow, of a round Figure, and broad enough to cover the Stump, and retain the other Dressings: Or, instead of this, a Piece of the Fungus called *Lupi Crepitus*, or Puff-ball, of the like Size and Figure. (14.) A Calf's or Swine's Bladder, or else a large sticking Plaster cut in the Form of a *Malta Cross*, (*Tab. II. Fig. 15.*) or three separate Plasters, two Spans long and two Fingers broad, for investing and securing all the other Dressings on the Stump. (15.) A Compress in Form of a *Malta Cross*, but larger than the Plaster. (16.) A thick square Compress, to invest the End of the Limb. (17.) Three other Compresses of two Spans long and two Fingers Breadth. (18.) A Roller or Bandage for the Deligation of the whole, of about five Ells long and three Fingers Breadth. Lastly, (19.) Some Wine, and other cordial Medicines, to assist and relieve the Patient in case of a Deliquium.

be removed by the actual Caution. This they recommend as the safest and easiest Method. But this Method is now rejected, on many Accounts, by the unanimous Consent of all modern Practitioners.

ⁱ But if a sufficient Portion of the Skin be left on to cover the Stump, it may perhaps heal as readily as the Stumps of Fingers thus amputated.

^k The Moderns have invented other Saws and Knives for Amputating, as may be seen in GARENGEOT's *Traité de Instr. Chirurg.* But these here described being equally as good in all Respects, I shall not insist on them.

V. The

Position of
the Patient,
Assistants,
and Surgeon.

V. The whole necessary Apparatus being thus provided, the next Business is for the Surgeon to dispose the Patient, Assistants, and himself in a proper Posture to begin the Operation. First, therefore, the Patient must be fixed on a low Chair or Stool, in the midst of the Room, the Surgeon standing betwixt his Legs, and six Assistants at least around him. One of these should stand behind the Patient to hold his Body; another on the Side of the affected Arm, which he is to hold fast by grasping the upper Part of the Cubitus: A third Assistant must hold the Hand, about to be amputated; and a fourth should stand on one Side with the Apparatus of Instruments, to hand them as they may be wanted by the Operator. A fifth Assistant must stand ready with the several Dressings, Compress and Bandage, necessary to complete the Deligation; and the sixth or last should be at Liberty to assist the Patient and Operator occasionally, in handing Wine, Cordials, or any other thing they may want.

What must
be done im-
mediately
before the
Amputation.

VI. Things being thus far advanced, the Surgeon, who should have a Napkin before him, to wipe his Hands when there may be Occasion, proceeds to fix the Tourniquet (*Tab. III. Fig. 1. K*) moderately tight about the Patient's Arm, in the Manner we before directed (in *Part I. Book I. Chap. II. Sect. IX. & seq.*) by which Means the brachial Artery will be compressed, so as to prevent any profuse Hæmorrhage: And the Nerve being also a Partaker of the same Stricture, will make the Patient less sensible of Pain from the Operation. But to prevent the Tourniquet (*Tab. III. Fig. 1. K*) from coming loose, the Turnstick must be held fast by the Assistant standing behind the Patient. But if you apply the Screw-Tourniquet, figured in *Tab. V. and VI.* they will adhere tight upon the Part, without being held by an Assistant. This done, the Assistant holding the upper Part of the Arm, should next draw the Skin strongly upwards, while the Surgeon applies the Tape tight, and circularly about the Part, a little above where it is to be divided, in order to secure the fleshy Parts close to the Bones, that they may be cut through more easily and evenly. Some, as VERDUYN, use a Leathern Strop with a Clasp, instead of a Tape or Fillet, for this Purpose, which we shall consider in *Chap. XXXVI. Sect. III.* following. The Surgeon now encourages his Patient with Expressions of Comfort, and with Wine, or Cordials, before he enters on the Operation.

The Opera-
tion itself
described.

VII. The Operation itself is next begun by an annular Incision made through the Skin, by the Surgeon, with a small Scalpel, the Arm being extended in a parallel or even Direction, by the Assistants: One of which is then ordered to draw the Skin upward as much as possible. The Surgeon next divides the Flesh, down to the Bones, all round, close by the Margin of the retracted Skin with the large crooked Scalpel (*Tab. XIII. Fig. 2.*) by which Procedure the Skin will wrap over the Stump, and the whole will be healed a vast deal sooner than by the Method formerly used. The Surgeon now takes the Scalpel, with which he divided the Skin, or else the double-edged Catlin, *Fig. 4.* and therewith cuts through the Flesh and Ligaments betwixt the Ulna and Radius; thereby also separating the Periosteum from the Bones where the Teeth of the Saw are to pass, to avoid violent Pain and Inflammation from a Laceration of that nervous Membrane by the rough Teeth of the Instrument. This is no sooner done, but the Assistants draw back the incised Flesh above and below, to open a Passage to the Bones. And that the Flesh above may be draw up as much as possible, to cut off the Bone higher than the Incision, you

must

must apply the slit Piece of Linen^a (mentioned before at N. IV. 6) so that its Heads being pulled upward by the Assistant who holds the superior Part of the Arm, he strives to elevate the Flesh, that the Bone may be taken off as high as possible, by which means the Stump will be more easily and neatly covered, and the Wound much sooner healed. The Surgeon must fix his Saw in this Operation, so that it may work upon both the Bones of the Cubitus at the same Time: Without which Caution, he will be liable either to cut one of them longer than the other, or else occasion a Fissure or Splintering of the single Bone, when it becomes so far divided as not to be able to bear the Stress of the Saw. He must also move the Saw gently at the beginning, till it is well entered; and then he may go on faster, but with Discretion: And to prevent the Saw from being pinched or obstructed in Motion by the Bones, the Assistant who holds the superior Part of the Arm should a little elevate the same, as the Hand should be a little depressed by the other Assistant, so as to make a Space large enough for the Saw to move freely: But this must be done gently and cautiously, for fear of breaking the Bones. And thus in one Minute or two the Amputation may be completed.

VIII. When the Surgeon has thus amputated the Hand with Part of the Cubitus, his next Business is, to make a strict Compressure and Deligation upon the larger Arteries to suppress the Hæmorrhage. But the better to discover the divided Arteries, the Surgeon must order the Assistant who holds the Tourniquet to relax the same a little: Or, if it be the Screw Tourniquet, *Tab. V.* or *VI.* he may loosen it a little himself; by which means the Blood starting from the Arteries, will shew their divided Orifices. If the Patient be plethoric, the Surgeon may be less sparing of the Blood at this Time, which must be received by a proper Vessel on the Floor: But in Case of Weakness, the Tourniquet must be instantly tightened again, to restrain the Flux. When the Cubitus is divided very low, near the Carpus, there will not be any great Occasion to secure the Arteries by a Ligature with Needle and Thread: Because the two or three Branches which run there, are but small, and may be well enough secured by Compresses of Lint with some Bits of *Vitriol. Roman.* or only by square Linen Compresses^b. But the Flesh and Ends of the Bones are to be well secured and invested with Dossils of dry Lint; over which again fix a large Piece of the Fungus called *Crepitus Lupi*, with or without a large Bolster of Tow, to be secured and retained on the Stump by a wet Bladder, or a Plaster cut in the Shape of a *Malta* Cross. Or, instead of a Plaster in that Form, you may more advantageously apply two or three long and narrow ones across each other, in the Form of a Star, upon the Stump; by which the Skin may be drawn down, so as to cover the Wound, and procure a speedy Cicatrification^c. Over the Plasters you are again to place a large Compress in Form of a *Malta* Cross, so

^a Some Surgeons use a thin Plate of Steel to elevate the Flesh, instead of this Piece of Linen.

^b M. CHABERT, in his *Obs. Chirurg. Paris.* 1724, asserts the Application of Vitriol to be here unnecessary: Since the Blood may be securely stopped, and the Arteries compressed, by properly disposing Linen or Lint formed into Dossils or Compresses about the Ends of the Vessels; securing them by a close Deligation or Bandage: Which, in weak Patients, I have found to succeed very well. Others think the Application of Caustics both unsafe and injurious, because the Eschar formed by the Vitriol frequently recedes or separates from the Vessel, and excites a profuse Hæmorrhage. V. RUYSCH *Epist. de nova Methodo Amputandi, &c.*

^c This Method LE DRAN highly recommends, *Obs. Chirurg.* Tom. II. p. 309.

that

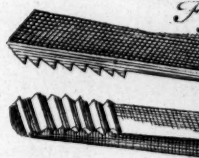
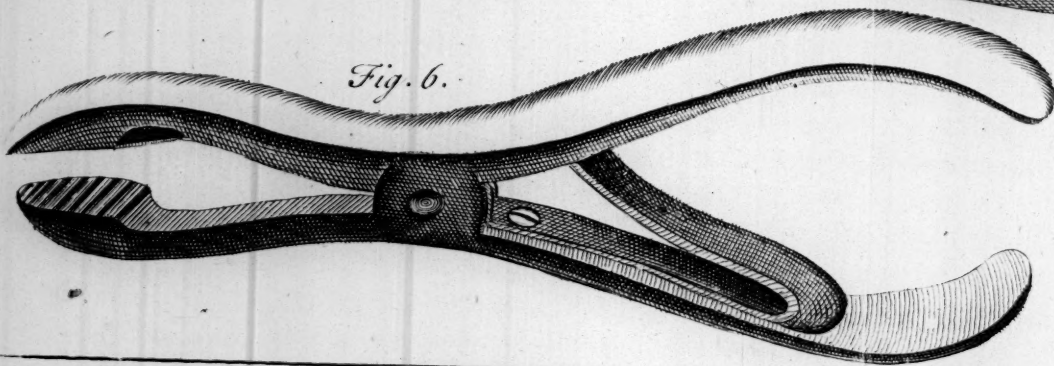
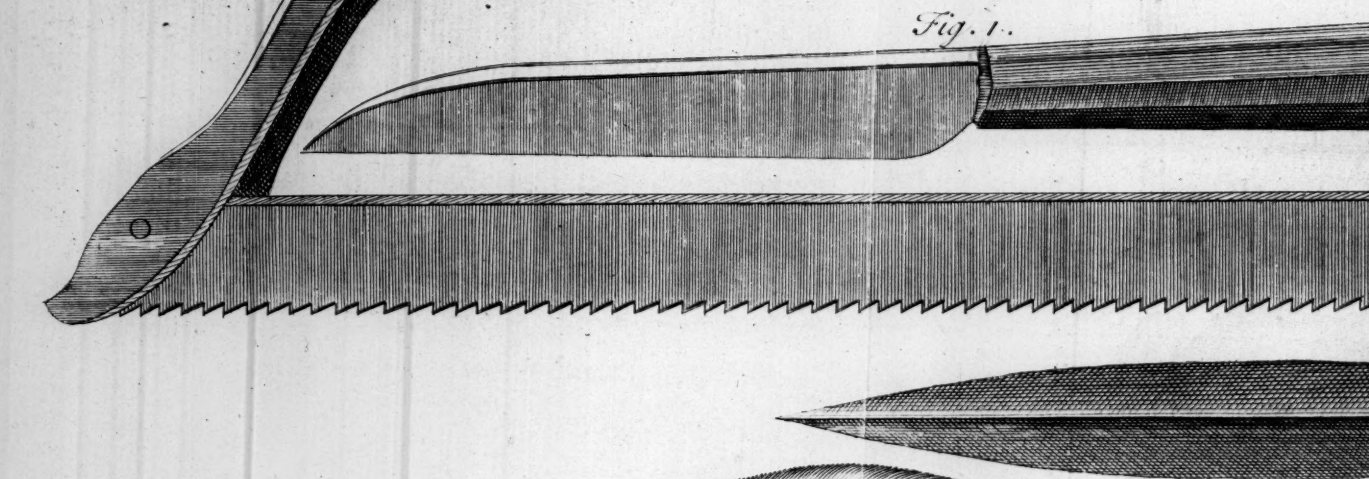
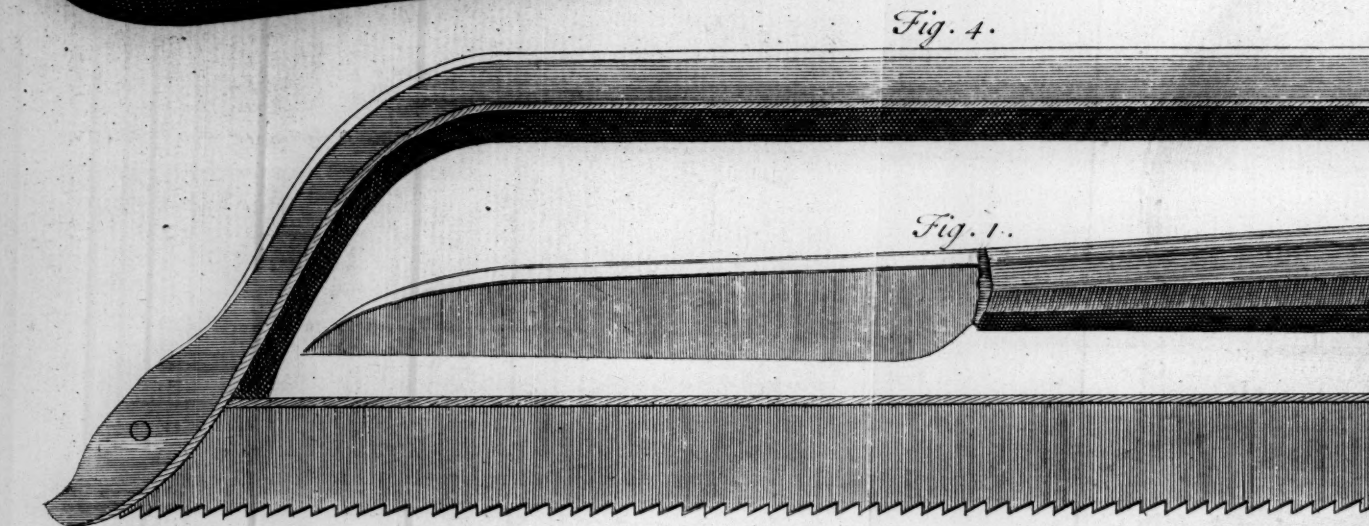
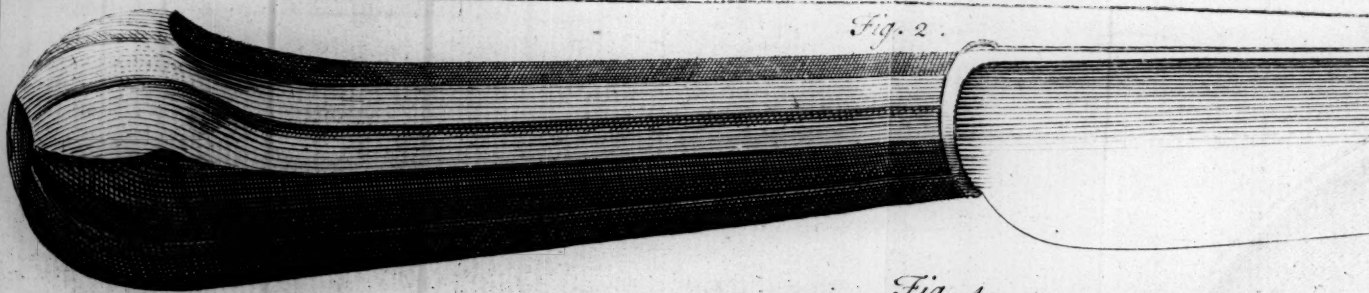
that it may closely invest the End of the Limb, where it should be held by an Assistant while the Ends are brought up and applied round the Arm. And lastly, you must fix first, one large square, and then three long and narrow Compresses upon the Stump, so that the last may intersect each other in Form of a Star, and come up towards the Humerus. Then you finish the Deligation with a long Roller in the Manner we shall direct at large, in treating of Bandages for the Arm.

The Hæ-
morrhage
sometimes
suppressed by
the actual
Cautery, or
Ligature.

IX. Most of the antient, and not a few of the modern Surgeons, approve of the actual Cautery for restraining the Hæmorrhage from the divided Arteries. This Practice is deservedly rejected by the most expert Surgeons of the present Time; not only for the severe Torture it gives the Patient, but because it is at best very suspicious, and even dangerous, especially in Amputations of the Humerus or Femur: For the Eschar formed by the Cautery very often separates in two or three Days time from the End of the Vessel which is stopped, and thereby occasions a profuse, if not a fatal Hæmorrhage. However, the Use of the Cautery will be more likely to succeed in Amputations of the Cubitus or Tibia, than in the Parts beforementioned: But even here it is best to follow the Method at N. VIII. preceding, and never to have Recourse to the actual Cautery without absolute Necessity. Lastly, if, for the greater Security you are desirous of taking up the Ends of the divided Arteries with Needle and Thread, according to the modern Practice, (which, in my Opinion, is not very necessary in Amputations at the lower End of the Cubitus or Tibia) you are in this Case to take hold of the End of each divided Artery with a Pair of Pliers, termed the Crow's Bill (*Tab. III. Fig. 4. or Tab. XIII. Fig. 5 and 6.*) or some other of a convenient Make: And after passing round your crooked Needle with strong waxed Thread, with the latter you tie up the End of the Vessel.

Amputation
of the Hu-
merus.

X. When the Amputation is to be made above the Elbow in the Humerus, the Operation is to be performed almost directly in the same Manner as we prescribed for the Amputation in the Cubitus: Except that the brachial Arteries, of which there are sometimes but one, sometimes two or three, are to be always taken hold of with a Pair of Pliers, and secured by Ligature with a crooked Needle and waxed Thread, as we just before mentioned in N. IX. For in these large Arteries the Use of Styptics or Cauteries are found to be of little or no Efficacy. After the Extremities of the large Arteries are tied up, you must relax the Tourniquet a little, to discover the rest; which are to be also secured in the same Manner. Some Surgeons pass a small Needle and Thread through the End of the Artery, whilst held by the Pliers, joining the Thread with that with which they next make the Ligature: Which Method they take, in order to secure the Ligature from slipping off from the End of the Vessel. There are others, who, instead of extending the Ends of the Vessels with a Pair of Pliers, use a very crooked Kind of Needle, with strong waxed Thread, with which they perforate the circumjacent Flesh, first on one Side, and then on the other Side of the Artery, tying up a good deal of the adjacent Flesh together with the End of the Vessel, in order to prevent the Thread from cutting through the arterial Coats. But I think either of these Methods are rather inferior than preferable to the first, in which the Artery is extended with a Pair of Pliers, and then secured by Ligature with a crooked Needle and waxed Thread, passed round the End of the Vessel. For in the two latter Methods there is Danger
of



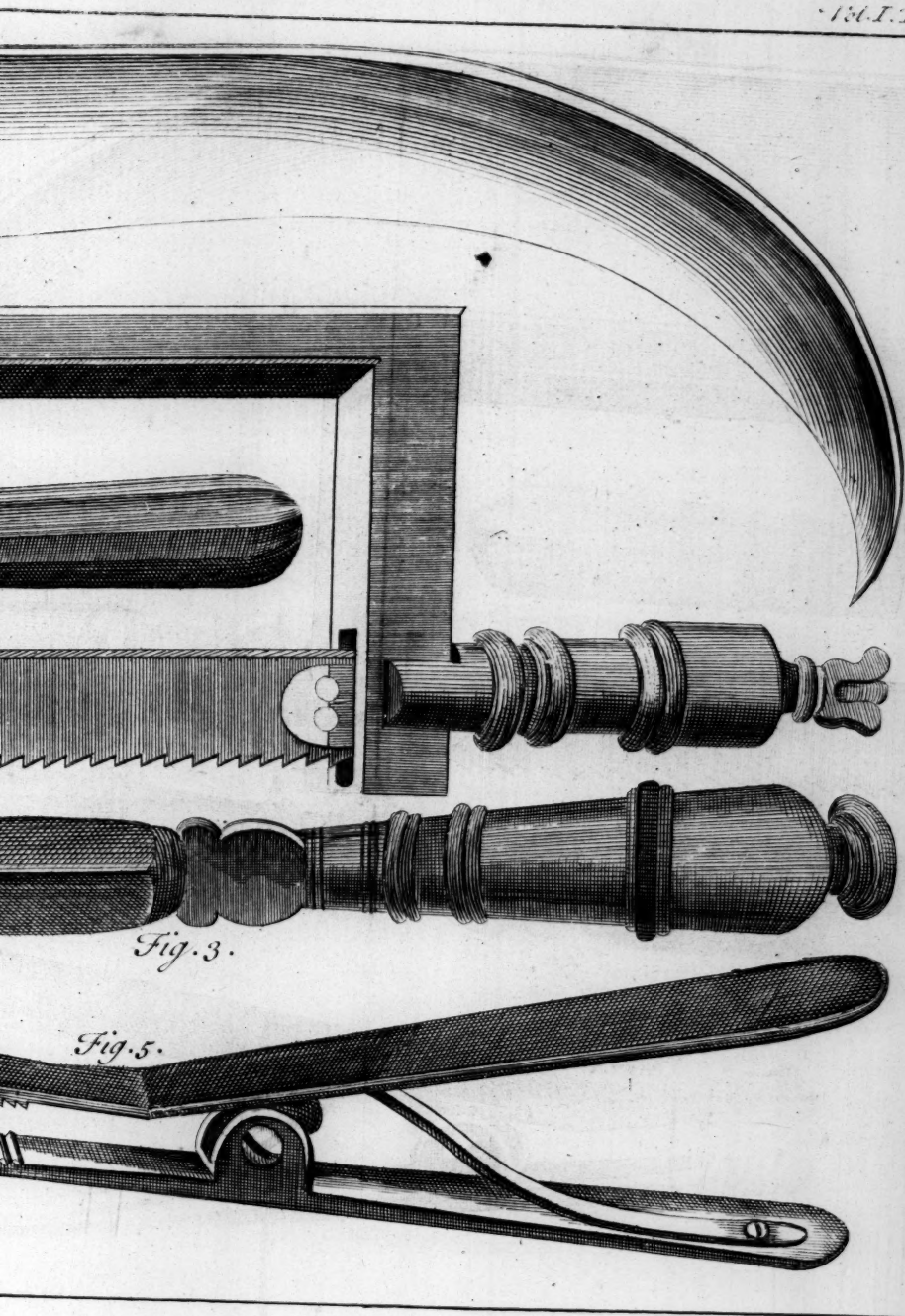


Fig. 3.

Fig. 5.

Plate 13.

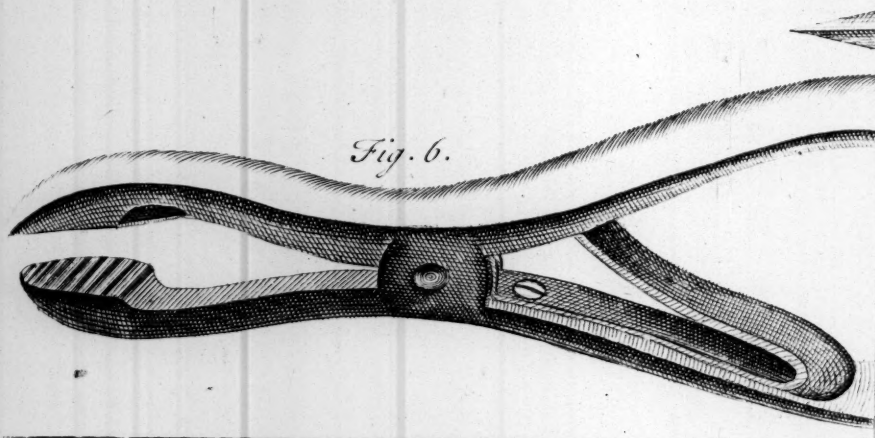
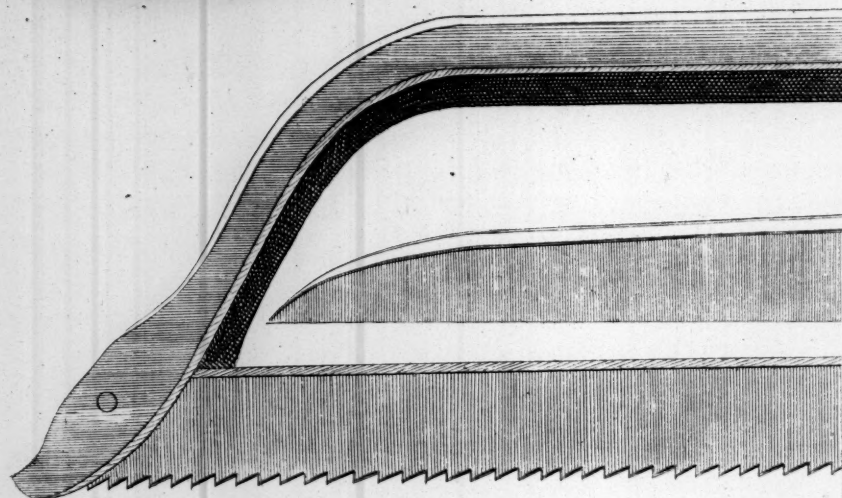
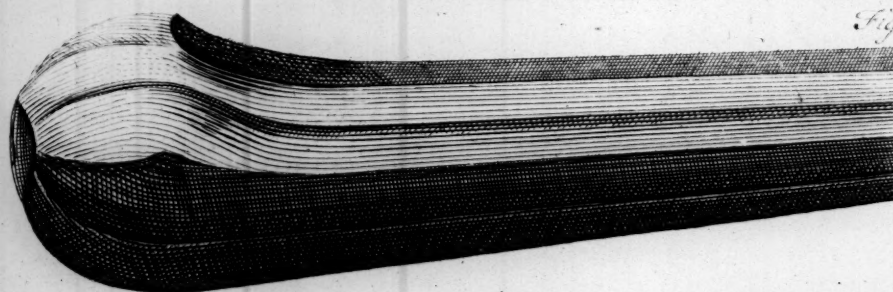


Fig. 6.

of passing the Needle wide of the Vessel, or at least the End of the Artery may easily fly back, or slip out of the Ligature^a.

XI. When you have dressed the Stump, and compleated the Deligation, according to N. VIII. the next Business is, to give the Patient a Draught of Wine or some Cordial; and when he is laid down upon the Bed, the End of the amputated Arm should be compressed by the Hands of an Assistant for some Hours, which will not only make the Dressings adhere more closely, but also prevent any consequent Hæmorrhage. This done, you may, by Degrees, relax the Tourniquet sufficiently to admit of the Blood's Circulation through the Part: And if, upon the Relaxation of it, you meet with no Blood from the Wound, it is a Sign the Operation has been well compleated. In the next place you must recommend Rest to the Patient, and order some nourishing Emulsion instead of common Drink, and paregoric Draughts to be repeated at proper Intervals; that he may hereby recover his lost Strength, and be eased of his Pains by Sleep. The next Day you may again loosen, or else totally remove the Tourniquet, and give Orders for a proper Diet and Regimen, such as will abate the febrile Heat and Motion of the Blood, and secure the Patient from a fresh Hæmorrhage, as in *Part I. Book I. Chap. I. N. XLIII.* These Accidents may be still better prevented by the Use of Phlebotomy at Discretion, with cooling Draughts and Powders: But Venesection must be avoided, when the Patient is weak, or has lost much Blood. If a fresh Hæmorrhage should appear, so as not to be suppressed by the Application of another Compress and Bandage, with compressing the Stump for some time with the Hands, (which are generally sufficient) in that Case you must re-apply the Tourniquet; and, after removing the Dressings, make a fresh Ligature upon the Ends of the Arteries. Or, if the Ends of the Arteries cannot be taken hold of, you may apply the actual Cautery, and defend the Stump with a larger Quantity of Lint, then secure it with an exact Deligation and Compressure for some time by the Hands, till the Hæmorrhage ceases.

Treatment
after the
Dressing.

XII. The first Dressings and Bandage ought not to be removed from the Stump before the third or fourth Day, when the Mouths of the divided Vessels may be supposed to be well closed and united: But in Case of Accidents, intense Pains, Inflammation, Hæmorrhage, or the like, you must renew them sooner. Nor is it amiss to order a Servant to attend constantly for the first Week at the Patient's Bed-side, provided with a Tourniquet, with which an incidental Hæmorrhage may be suppressed, till the Surgeon can be called to renew the Deligation. But if every thing succeeds well, in renewing your Dressings, you ought to remove them one after another very tenderly, and those which are next, or adhere to the Wound, should not be touched at all, much less violently forced away, if you are desirous to avoid irritating the Part, and inducing an Hæmorrhage. 'Tis in this Case much the best for you to leave the adhering Dressings upon the Part for a few Days, and to moisten them at each Dressing with warm Wine or its Spirit, till they become loose, and separate spontaneously in the Suppuration, without using any Violence. After the first Dressing, you need not dress again above once every other

When and
how to re-
new the
Dressings.

^a See DOUGLASS, *Syllabus Operat. Chirurg.* p. 44, 45. where, after the Amputation, he advises the Surgeon to unite the Skin crosswise.

Day, or every Day at most, except your Discharge be great, and in the Summer time.

What is to
be observed
in the Dressings.

XIII. In renewing your Dressings, it is chiefly necessary for you to observe, that your Wound be well and gently cleansed from all the foul Matter with Lint, and then to dress it with flat Plates or Pledgits of scraped Lint; of which that next the Wound should be moistened with some digestive Ointment, and the rest applied dry. The Pledgits of Lint are to be secured and retained upon the Stump by three, four, or six sticking Plasters of *Emp. Diapalmæ*, or the like, of about a Foot in length, and a Thumb's breadth, crossing each other upon the Part like a Star. Over these Plasters must again be fixed a large square Compress; and over that three other long and narrow Compresses in a stellar Position, securing the whole by Deligation with your Roller. When your Dressings have been thus continued for about a Fortnight, there will not be occasion for so much Lint, nor so many Compresses as at first: Nor need you then make your Bandage so tight, as there is no Danger of any Hæmorrhage. But in the mean time you must continue to treat the Wound with digestive Ointments and vulnerary Balsams, retained with Lint, a Plaster, Compress, and Bandage, as in other Wounds, till it be healed; which usually happens in about two Months. For the rest, it may be here proper to advise the Surgeon to apply the Tourniquet, before he removes the first Dressings; especially in Amputations of the Humerus or Femur, in order to prevent an Hæmorrhage: Or at least the brachial Artery should be compressed in the Middle of the Arm by the Thumb of an Assistant.

Treatment
of the Fever.

XIV. Lastly, as Amputations are often followed soon after with a Fever, especially in plethoric and strong Habits, it will, in that Case, be necessary to use Phlebotomy with paregoric and cooling Medicines, joined with a proper Regimen and Diet: Without which there may be Danger of losing the Patient, either by the Violence of the vulnerary Fever, as it is termed, by a Sphacelus of the Part, or other bad Accidents.

AN EXPLANATION of the THIRTEENTH PLATE.

Fig. 1. Exhibits a small sized Scalpel, more commodious for dividing the Skin and Flesh in Amputations than the large crooked one following.

Fig. 2. Is the large crooked or falciform Knife, commonly used for dividing the Flesh to the Bone in Amputations of the upper and lower Extremities, though in most Cases I prefer the small one, Fig. 1.

Fig. 3. The Catlin, or double-edged Scalpel, for dividing the Flesh and Ligament betwixt the Bones of the Cubitus and Tibia; which may be also performed by a less and single-edged Scalpel, like that in *Tab. I. G.* This Knife is also used in the Method of amputating the Tibia, which preserves the Calf.

Fig. 4. Represents the Saw used for amputating Bones of the Limbs. This Instrument is by many delineated as large again as our Figure of it: But a Saw of the same Size, or but little larger than our Figure, will perform the Operation as well, and even more commodiously than a larger. This and the two preceeding Instruments are usually embellished with various Ornaments; which may serve to encumber them, and enhance their Price, but can add nothing at all to their Usefulness.

Fig. 5. Re-

Fig. 5. Represents a Pair of Pliers, furnished with Teeth at one End, and a Spring at the other, for taking hold of the Ends of divided Arteries, in order to secure them by Ligature with strong Thread, and stop their bleeding in Amputations of the upper and lower Extremities.

Fig. 6. Is another Pair of Pliers for the same Use, taken from M. GARENGEOT; which may be also made with very flat or no Teeth at the End, to avoid injuring the Coats of the Artery.

C H A P. XXXV.

Of Amputating the FOOT and LEG.

I. **T**HE antient Surgeons, in Amputating the Foot at the Tarsus or Metatarsus, used a large Chisel and Mallet, and sometimes a Pair of large Cutting Pincers, with which they separated the diseased Parts, and then treated and healed the Wound with Balsams in the usual Manner: Which Practice is confirmed and explained by SCULTETUS, in his *Armament. Chirurg. Tab. LIV.* But as the Tendons and Ligaments, seated in those Parts, are, in this Method, violently lacerated and contused, the modern Surgeons have therefore justly preferred the Amputation of the Toes and Metatarsus by the Scalpel; conducting the Remainder of the Cure as in other Wounds: And in this Manner the Leg may be much better supported by the Heel or Stump, than by a wooden Machine^a. But because they were afraid of this Practice, from the Difficulty of covering the Bones, and healing up the Wound, they rather followed the more dangerous Method of Amputating the Leg about four Fingers Breadth below the Knee, instead of taking it off in the lower Part of the Tibia. By this Means, though they cut off a large Part of the Leg which was not yet disordered, they avoided the Deformity and Inconvenience in sitting down, which the Patient would have met with from preserving it on: For a long Stump of the Leg can neither be stood upon nor well adapted to a wooden Machine. Therefore it was thought most convenient to amputate it in the upper Part of the Tibia, about a Hand's Breadth below the Patella, to avoid injuring the Tendons of the flexor Muscles, and the better to adapt the Knee to a Silver or wooden Leg. I am indeed sensible that many Surgeons, even at present, approve of Amputating no higher than the Disorder has spread itself, agreeable to the Advice of SOLINGEN, VERDUYN, and DIONIS. But I think their Authorities ought to be but little regarded; not only because of the Difficulty there will be of adapting a wooden Machine to the lower Part of the Tibia above the Ankle, but also upon the Account of the Deformity which the long Stump of the Leg will occasion, if the wooden Machine is adapted to the Knee.

II. With regard to the Instruments and Dressings used in this Operation, they are almost the same which we before described for Amputating the Arm: Only it may be here necessary to add a few Cautions which relate more particu-

The Place
for amputat-
ing the Ti-
bia.

Observations
peculiar to
Amputati-
ons of the
Tibia.

^a This GARENGEOT advises, *Oper. Chirurg. Tom. III. p. 417. Edit. 2.*

larly to Amputations of the Tibia. These are, (1.) To place the Patient upon a low Seat or Bed, so that he may lean backward, and extend his Legs^a. (2.) To shave off the Hair with a Razor from the Part where the Amputation is to be made, to prevent the Plasters, afterwards applied, from adhering to them, so as to give the Patient intense Pain in removing them. (3.) To secure the divided Arteries, which appear in the Stump of the Tibia, rather by Ligature, with Needle and Thread, than by Styptics, or actual and potential Cauterics. For though these Arteries do not appear very large, yet if they are not secured by Ligature, they generally open and bleed profusely soon after the Deligation; especially if the crural Artery be not well secured with narrow Compresses and Bandage. (4.) The crural Artery is to be compressed with the Tourniquet, either of the common Sort, turning with a Stick, or the modern Screw Tourniquet. Or else you may make a strict Ligature above the Knee with a Bandage twisted in a cylindrical Form, so as to compress the Artery descending in the Ham, as in *Tab. XIV. Fig. 4. D.* Yet, in my Opinion, it is much better to apply the same Ligature higher up upon the Thigh, in order to compress the Artery, especially when the Tibia is to be amputated near the Knee. See *Tab. III. Fig. 1. LM*; by which means the Dressings may be more conveniently applied after the Operation, than if the Tourniquet was fixed nearer to the Knee.

VERDUYN'S
Method of
Amputating.

III. We have another new Method of Amputating the Tibia proposed by VERDUYN, in a Dissertation upon the Subject in the Year 1696: Which Practice he strongly recommends for the publick Good; though he does not pretend to be the original Author of it. There are indeed many who attribute the Honour of inventing this Operation to one SABOURIN of Geneva, as GARENGEOT, and some other Members of the Royal Academy; who assert, that in their Time VERDUYN performed the Operation first at Geneva, and then at Paris. At the same time I find the Operation described and performed by the English Surgeons LOWDHAM and YOUNG, in an English Treatise concerning the wonderful Virtues of Oil of Turpentine in Hæmorrhages, together with a new Method of Amputating, by JAMES YOUNG, 8^{vo} Lond. 1679. The same Operation was afterwards improved and described by my Friend KOENERDINCUS, Surgeon of the Hospital at Amsterdam, in his Dutch Treatise *De Gangræna & Sphacelo, Cruraque amputandi Ratione veteri ac nova*, 8^{vo} Amstel. 1698; which was the same Year in which VERDUYN twice performed this new Method of Amputation. A brief Description of which is as follows.

IV. First, the *Tendo Achillis* is divided from the Ankle by the Scalpel, *Tab. XIII. Fig. 3.* then a longitudinal Incision is made upwards, and the Tendon separated from the Bones of the Leg as high as the Part where the Bones are to be amputated by the Saw: See *Tab. XIV. Fig. 4, 5, 6, 7.* This done, the Flesh composing the Calf of the Leg, *Fig. 6. A.* is drawn backward with a Cloth towards the Ham, by the Hand of an Assistant: And then the Integuments and Flesh upon the Forepart, and betwixt the Bones, are divided in the usual Manner, by a proper Scalpel, *Tab. XIII. Fig. 1 and 3*; and the Bones next amputated by the Saw. Then the Flesh is brought over, and adapted to

^a HILDANUS in this Case places the Patient on the Ground, but his Foot on a low Stool.

Sect. I. *Of Amputating the Foot and Leg.*

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the Stump of the Tibia, after it has been first washed with Spirit of Wine: and if there be any unequal and superfluous Parts, they are cut off with a Scalpel; the Remainder being retained in its proper Situation by sticking Plasters, or a few Stiches with Needle and Thread. Lastly, Compresses with a wet Bladder and Bandage are applied in the Manner we before directed, in treating of Amputations in general: Or, instead of them may be used a retentive Machine, figured by VERDUYN and GARENGEOT, for the Purpose, being made of Leather, with Straps and Buckles, by which the Stump being secured, it is then to be compressed for a few Hours by the Hands of an Assistant, till there is no Danger of an Hæmorrhage. To prevent that, you may also apply the Screw Tourniquet, *Tab. V. Fig. 6.* or *Tab. VI. Fig. 1.* Thus the Operation is compleated, the Advantages of which to the Patient, according to the forementioned Authors, are many. As, (1.) The Calf of the Leg being thus preserved and adapted to the Stump, closes and compresses the Mouths of the divided Arteries, so as to prevent an Hæmorrhage, without the Use of Cauteries, or the Application of Ligatures. (2.) The Ends of the Bones being thus immediately covered with the Flesh, are not so liable to be infested with a Caries, as they frequently are in the common Method, which greatly retards, if it does not frustrate the Cure. (3.) The Flesh of the Calf readily unites with the Ends of the divided Bones of the Leg; so that by treating the Wound with vulnerary Balsams, in the subsequent Dressings, the Cure is speedily compleated. Lastly, (4.) The Flesh thus adapt to the Ends of the Bones, serves as a Pillow ever afterwards to support them; so that the Patient may easily sit down, without being obliged to bend the Stump, as he must do after the common Method. Add to this, that the Stump may be adapted perpendicularly to a hollow wooden Leg, so that the Patient may stand or walk upright upon an artificial Leg, as upon his natural one. Every time the Stump is dressed, the Portion of Flesh which wraps over it, must be gently supported, and pressed up against the Ends of the Bones, that its Weight may not make it separate or subside, so as to prevent its uniting. A more particular Account of this Method may be seen, illustrated with proper Figures, in the forementioned Treatise of VERDUYN.

V. Notwithstanding the before-described Method had been several Times performed with Success by VERDUYN, and some others, yet it met with the Approbation of but few Surgeons: So that it was not able to prevail over the common and received Method of amputating the Tibia. Infomuch, that it was soon after deserted even by its own Patrons, VERDUYN and KOENERDINGIUS: To which add, that the Patient, upon which SABOURIN performed this Operation at *Paris*, died soon after it, as did several at *Amsterdam*; at which last Place several Patients were troubled with acute Pains, and other bad Accidents, from little Splinters, or the rough Ends of the Bones irritating the Flesh, even after the Stump was healed up: Not to mention the large Quantity of Blood lost by SABOURIN's Patient, which was even greater than in the common Method of amputating; which, with other Inconveniencies, induced KOENERDINGIUS to prefer the common before this new Method, in his Treatise on this Subject. Notwithstanding all this, we find M. GARENGEOT, who seems to be ignorant of the forementioned Writings of YOUNG and KOENERDINGIUS on the Subject, endeavouring lately to recommend and re-establish this uncommon Method of Amputating: As may be seen in *Chirurg. Operat. Chap. of Amputations of the Tibia.*

VERDUYN
deserts his
Method.

Tibia. M. GARENGEOT there relates, that there were several Men then living in France, who had the Operation happily performed on them in this Manner; so that they could not only sit down easily, but also leap very nimbly. But if we would reasonably expect to succeed in this Method, the Patient ought to be not only healthy in all other respects, but the Cause, which requires the Limb to be amputated, should be from some external Violence.

The same Method practicable in the Humerus.

VI. Lastly, it is to be observed, that the new Method of amputating, which we have been now describing, may, according to the Opinion of our modern Surgeons, be not only performed in the Tibia, but also in the Cubitus, by preserving a Quantity of the Flesh and Integuments, to wrap over the Ends of the Bones. Agreeable to this, the Operation was in the same Manner performed with Success by RUYSCH, in the Presence of VERDUYN and BORTELIUS his Kinsman. See the Treatises on this Subject by YOUNG and KOENERDINGIUS; also RUYSCHII *Epist. Problemat.* XIV. *de nova Artuum decurtandorum Methodo.*

C H A P. XXXVI.

Of Amputating the THIGH.

Amputation of the Femur, when necessary.

I. THE Surgeon frequently finds it necessary to amputate the Leg above the Knee, removing Part of the Thigh itself, when a Mortification has reached the Joint, or when the lower Head of the Femur is carious, sphacelated, crushed to pieces, or the large crural Artery irrecoverably wounded. In these Cases the Success of the Operation is very dubious, especially when the Amputation is made very high up in the Thigh. Nor is the Patient in Danger of being lost only from a profuse Hæmorrhage, from the Division of so large an Artery as that of the Femur; but the Quantity of Matter discharged daily from so large a Wound does often so much extenuate and weaken the Patient, that he cannot subsist till the Cure is completed. Therefore whenever the Surgeon finds it necessary to amputate in the Femur, he ought to do it as low as possible, as near within three Fingers Breadth of the Knee as he can, leaving a good deal of Flesh, and more of the Skin, to wrap over the End of the Stump: By which means the Cure of the Wound will be much expedited, the Discharge of Matter at each Dressing rendered less profuse, and the Patient, not being so much impaired in his Strength, will be more likely to get happily through the Cure.

Application of the Tourniquet.

II. The Application of the Tourniquet for compressing the crural Artery, whether it be the common one with the cylindric Ligature and Turn-stick, or the Screw Tourniquet, must be made upon the upper and internal Part of the Thigh, as near as you can to the Place where the Head of the internal Vastus Muscle and the Triceps touch each other, as in *Tab. III. Fig. 1. L M.* Without this Precaution you may be liable to have such a profuse Hæmorrhage from the large femoral Artery as will inevitably destroy your Patient; which frequently happened to the antient Surgeons before the Invention of the Tourniquet.

III. With

III. With respect to Amputations of the Thigh in general, little more need be added to what has been said on this Operation in the Arms and Legs: As in the first Place, to let the Hair be shaved off, and after you have made a circular Incision through the Integuments with a small Scalpel, *Tab. XIII. Fig. 1.* to extend or draw them upwards as much as possible before you divide the Flesh, or Muscles, which last you must amputate a good deal higher than the circular Incision through the Integuments. You may cut through the muscular Flesh at your second Incision, either with the Scalpel, with which you divided the Integuments, or with the Knife for amputating Breasts in *Tab. XXII. Fig. 7.* or else with the large crooked Knife in *Tab. XIII. Fig. 2.* With either of which you must cut all round close to the Bone: By which Method of proceeding you will have the Stump of the Bone covered over with Flesh and Skin in a little time, so as to be healed in a few Days; and at the same time you avoid the risque of a Caries in the Bone from its being exposed to the Air, as we once before observed. For want of this Precaution in Amputations of the Thigh, when the Muscles have been divided even with the Integuments, the Muscles have contracted, and drawn themselves up to such a Degree, that I have frequently seen the Bone standing out like a Stick for above two or three Fingers Breadth from the Flesh. In this Case the Patient must be a long Time, and be much weakened by the Discharge of Matter, before the Muscles can be extended and brought down, so as to cover the End of the Bone, without which the Cure can never be completed. With regard to the Hæmorrhage in Amputations of the Thigh, that must be always prevented by making an exact Ligature upon the femoral Artery, which is much too large to be safely secured by any other Method; and, for the same Reason, your Ligature upon it must be very firm and secure, by tying it up with a strong Thread passed round after the End of the Artery is extended or drawn a little out from the Flesh with a Pair of Forceps, or a Tenaculum, *Tab. XIII. Fig. 5. and 6a.* If there appear to be more large Arteries than one divided, they must be also secured by Ligature in the same Manner; but for the smaller Arteries, it may be sufficient to close them by Styptics, or Vitriol, and Dossils of scraped Lint without Ligature. The Dressings and Deligation are to be much the same for an amputated Thigh, as we before directed for an Amputation of the *Humerus*: Only the Quantity of Lint, Fungus, Bladder, Compresses, &c. must be proportionably larger, and the Bandages much longer. To which you must here add a long, thick, and narrow Compress, to be imposed all along the Thigh over the crural Artery, and secured there by a Bandage peculiar to itself: Or, instead of this, you may fix the Tourniquet, *Tab. V. Fig. 6. or Tab. VI. Fig. 1.* and leave it upon the Limb for some time. The Deligation being completed, and the Patient put to Bed, his Thigh must be placed in an easy elevated Posture on a Pillow, that the Impetus of the Blood, on the End of the Artery, may be less than in a direct Position: Which will greatly conduce to the Prevention of a fresh Hæmorrhage. Lastly, the Stump should be compressed for some Time by the Hands of an Assistant, ordering a proper Diet, Regimen, Medicines, &c. as we observed in Amputations of the *Humerus*.

* PETIT gives a Description of another Ligature, *Mem. Acad. Reg. Paris.*

Treatment
of Limbs
amputated
by Gun-shot.

IV. If Part of the Leg or Arm should be carried away by a Bullet-shot, or Cannon-ball, or be torn off by a Cart-wheel, or Mill, or some such other Machine, the first Step to be taken by the Surgeon in these Cases, is, 1. immediately to apply the Tourniquet to compress the Artery, and stop the Hæmorrhage: And then, 2. To cut off the rough End of the Bone by the Saw, or cutting Pincers, that there may be no Points or Splinters to irritate the sensible and fleshy Parts. But if there are no Splinters, or rough Parts, the Surgeon need not cut off any thing. Lastly, 3. To secure and close up the Ends of the wounded Arteries, either by Ligature, when they are large and accessible, or else by the Cautery, or by Compressure with Lint, Styptics, and Compresses, according as particular Circumstances may indicate to the Surgeon. Which being performed, the rest of the Dressings and Deligation are to be completed in the Manner we have before directed for other Amputations^a.

BOTAL-
LUS's Me-
thod of am-
putating re-
jected.

V. The celebrated French Physician BOTALLUS formerly invented a very expeditious Method of amputating Limbs in an Instant, by letting a sharp Instrument fall down upon them from a certain Height loaded with a great Weight; by which means the Limb is struck off at one Blow, without the Use either of Knife or Saw. BOTALLUS has been also seconded in this Method of amputating by HILDANUS. Notwithstanding which, the Artifice has been reasonably rejected by almost all the prudent Surgeons, who have succeeded them: For it is hardly possible that a Limb should be taken off in this Manner without shattering or splintering the Bone. Consult BOTALLUS in his Treatise, *De Vulneribus Sclopetorum*.

The adapt-
ing of artifi-
cial Limbs.

VI. After the Stump is healed up, the Surgeon may provide an artificial Limb of Silver, for those who can afford it, or of Wood for others; adapted to the Stump, so that it may be fastened on by Straps and Buckles, or by Springs. Of these Machines we are furnished with various Specimens in AMB. PAREY, HILDANUS, SOLINGEN, &c. and by our modern Artists, who make these kinds of Instruments, and other curious Machines. But, for the poorer Sort, it may be sufficient to supply them with a wooden Machine, turned and cut into a proper Shape, with a Hollowness or Cavity at the upper End for receiving the Stump of the Knee, that they may, by this means, be enabled to walk, or sit down, though not in an elegant Manner.

Removal of
a Caries.

VII. As a Caries of the Bone is no unfrequent Accident in Amputations, the Surgeon should therefore endeavour to guard against it as much as possible: Even at its very first Appearance he should strive to remove it, either by the Application of *Euphorbium*, or the actual Cautery, because it prevents the Progress of the Cure; notwithstanding the Writers in Surgery usually pass by this Accident, without taking notice thereof. There still remains a Practice which, in my Opinion, will very often succeed beyond either *Euphorbium*, or the Cautery; and that is, to exfoliate or pare off the diseased Parts of the Bone with a Knife or Rasp till you come to the sound: By which means the Flesh will then readily unite with the Bone to complete the Cure, which it cannot while the Caries remains.

^a PETIT has described a Machine for suppressing the Hæmorrhage in the crural Artery after this Amputation, which will effect it without a Ligature on the Artery, or any other Method above-mentioned. *Mem. Acad. Reg. Paris. A. 1731.* This Machine you will find in my *Plate XXXIX.* with a particular Description of it.

C H A P. XXXVII.

Of Amputating the ARM in its Articulation with the SCAPULA.

I. **T**HOUGH I never yet attempted to amputate the Humerus in its Articulation with the Scapula, nor so much as found it treated of by any of our Chirurgical Writers, except LE DRAN, *Obs.* 43 and 44. after whom the Operation is described, without mentioning his Name, by GARENCEOT, (*Chirurg. Operat. Cap. LIV.*) yet, that the Surgeon may not be ignorant of what has been advanced on this Head, I shall make it the Business of this Chapter to give a brief Description thereof.

The Design
of this
Chapter.

II. According to the two last mentioned Authors, there are two Cases in which it may be necessary to amputate the Arm in its Articulation at the Shoulder. The first is, when the upper Part of the Humerus is violently contused and shattered by a Cannon-ball, Bomb, or Grenade. The other Case is, when the upper Head of the *Os Humeri* is irrecoverably vitiated from some internal Cause, as from an Abscess, a Caries, or *Spina Ventosa*: To which we may add, a Mortification of the Arm extended to the Shoulder, &c.

When the
Arm may
be thus am-
putated.

III. But before you enter on this dangerous and difficult Operation, it will be absolutely necessary to have every Member of your Apparatus of Instruments and Dressings prepared and disposed each in their proper Order: After which you are to fix the Patient upon a convenient Seat with his Face covered. You must next observe, that the Tourniquet is not here fixed upon the Arm, as we before described for the common Amputation of it: But that Instrument is, in this Case, laid aside, and the Trunk of the brachial Artery is first secured, by Ligature in the following Manner, before you begin to amputate.

Previous Re-
quisites for
the Opera-
tion.

IV. The Patient being properly seated, with his Arm extended, and secured by an Assistant, you must then carefully search out the true Seat and Course of the brachial Artery at the Axilla: In doing which you will be much assisted by being previously versed in the Anatomy of the Part. If the Tumor should be so large as to prevent your Investigation of the Artery, by feeling through the Integuments, you make a longitudinal Incision through them to the Bone, on each side the Arm, so that you may pass your Fingers by the Bone, and discover the Artery. Which done, you must then pass a large Needle^a with six or eight Threads through the Flesh within two Fingers Breadth of the Cavity in the Axilla, so that the Needle may pass through close to the Bone, and betwixt that and the Artery, without injuring the latter. The Needle and Ligature being thus conveyed betwixt the *Os Humeri* and Artery, the Arm is now let down a little, to relax the Skin, and the Ligature is then tied with a Surgeon's Knot. Your next Business is, to examine if there be any Pulse in the Artery below the Ligature as it runs down the Arm: If so, your Ligature must be drawn tighter till you can perceive no Motion there: And then your Ligature must be secured from getting loose by a Knot or two more.

What is to
be first done
in the Opera-
tion.

V. There are three Things chiefly necessary for you to observe in the Operation, after the Artery has been thus secured by Ligature to prevent a fatal Hæ-

What is to
be observed
in the Opera-
tion.

^a LE DRAN uses a strait Needle; but GARENCEOT recommends a crooked one, like that to be seen in *Tab. XIV. Fig. 10.*

morrhage. These are, 1. To leave Skin and Flesh enough upon the Shoulder; 2. To cut through the muscular Flesh in the most convenient Manner; and lastly, 3. To divide the capsular Ligament which invests the Head of the Bone, and connects it to the Scapula, so that it may be taken out of the glenoid Cavity in the latter, and be afterwards amputated entirely. To perform each of these Intentions with Success and Dexterity, the Surgeon ought previously to make himself well acquainted with the Nature of the Articulation, with the Position of the *Processus Acromion*, and to be careful that a sufficient Quantity of Skin be preserved and drawn back to wrap over the Wound; and, lastly, to amputate with his Scalpel two or three Fingers Breadth below the Acromion, so as to preserve a large Portion of the deltoid Muscle. This Method will not only fill up the Cavity of the Wound at the Shoulder, so as to render it uniform and even, but will also much expedite the Cure.

The Manner
of Ampu-
tating.

VI. Every thing being thus far considered and advanced, you now take the Scalpel, *Tab. XIII. Fig. 1.* or *Tab. XII. Fig. 14.* and therewith make your Incision through the Integuments, and through the deltoid Muscle, as near within the Joint as we before directed. Which done, the Arm is then gently elevated, the better to discover and divide the Heads of the Biceps Muscle: And if, in performing this, you divide any considerable Arteries or Veins, which bleed so as to obscure your Work, they may be stopped for the present, either by Compressure with the naked Fingers of an Assistant, or by the Application of Lint and Compresses. But if the Hæmorrhage is profuse, and arises from a considerable Artery divided, as there frequently is a large Branch here, you must, in that Case, first secure it by Ligature, before you proceed farther in your Operation. The next Step is, to divide the Ligament of the Articulation first in its upper Part, and then on each Side, but very cautiously; moving the Head of the Humerus at the same time with your left Hand, that you may only divide the investing Ligament of the Articulation without injuring the Artery. Thus you may be sensible whether the Arteries are well secured: But even afterwards you must be very cautious not to wound the Artery, in dividing the rest of the muscular Flesh beneath the Articulation. Lastly, you must divide the Skin from the Arm near the Axilla, to leave a triangular Piece, with its Corner outermost, and its Basis next the Body, so as to be afterwards brought up over the Wound: And thus your Amputation is completed.

What must
be done af-
ter the Am-
putation.

VII. The Arm being totally removed in the Manner now described, you must next search for the Artery you before secured by Ligature, together with a Portion of the Flesh; and having discovered it, you now make another Ligature above the former upon the Vessel only, by a small crooked Needle, *Tab. VI. Fig. 5.* with strong Thread: After which you remove the first Ligature from the Flesh and Vessel, to prevent it from exciting an Inflammation.

Dressings
and Deliga-
tion.

VIII. You come now to the Dressings of the Stump: Which must be made with a Pledgit of Lint, with small Linen Compresses upon the Ends of the divided Arteries you before secured by Ligature. The lower Part of the Skin is then drawn upward, and the upper Part is drawn down together with a Piece of the deltoid Muscle. Though, in my Opinion, it would be better to apply no Pledgit or Compresses to the Arteries or Bone, before you have thus filled the Sinus of the Wound with the adjacent muscular Flesh, and brought the Skin well over: And then you may apply your Pledgit of Lint and Compresses; by
which

which means the Flesh will more readily unite, and the Wound heal sooner than if you interposed Lint and Compresses. In the next Place, a large Quantity of Lint must be secured on the Wound by a sticking Plaster, cut in the Shape of a *Malta Cross*: Over which Plaster you impose a large and thick square Compress, with a cylindric Compress in the Axilla, to resist against the Ends of the Arteries, that they may be better able to endure the Impetus of the Blood in their Pulse. All these are to be again retained by a large double Compress in the Form of a *Malta Cross*; and that again invested by two other Compresses a little more than a Foot long, and four Fingers Breadth. The first of these is applied obliquely over the Stump, so as to let one End come over to the sound Shoulder, and the other End pass behind to the sound Axilla, or about a Hand's Breadth lower: The other and longer Compress must be imposed, so as to cross the former in opposite Directions, and to have its Ends cross each other upon the sound Shoulder. Lastly, your Deligation must be completed with the Bandage termed *Spica descendens*, as we shall direct in the last Part of our Surgery. But, in making this Bandage, you must fix a thick Compress, or a small Pillow, in the Axilla, that the Bandage may fit the neater, and not compress the Veins too much which are there seated.

IX. The abovementioned Operation, as here described, was performed on a *French Nobleman* for a *Spina Ventosa*, in the upper Head of the *Humerus*, by *LE DRAN* the Elder, with the Consent and Presence of the most expert Surgeons in *Paris*, as *M. MARESCAL, ARNEAU, PETIT, MERY, &c.* And this he did with Success, the Patient being perfectly cured, as we are told by *LE DRAN* his Son, and *M. GARENGEOT*. But the last of these Authors tells us, in a second Edition of his Operations in Surgery, that the said Nobleman died within six Months afterwards of a *Plethora**. *M. GARENGEOT* also directs this Operation to be performed for an Abscess in the Articulation. But whether it would be prudent to perform so dangerous and difficult an Operation, for a simple Abscess there, I leave to the Judgment of every experienced Surgeon.

A Method of Amputation not much unlike this, which I recommended in the Arm, after an extraordinary Burn, *A. D. 1739*, you have here as follows: A poor Woman in a neighbouring Town, as she sat alone at Home, being seized with a Fit, fell into the Fire; by which Accident her Right Arm was burnt to the Bone, from the Hand quite up to the Shoulder, (see *Plate XXXIX. Fig. A and B.*) There was no Way of preserving the poor Woman's Life, but by taking off the Arm. But as the Tourniquet could not be applied without giving her excessive Pain, (the Skin being burnt to the Neck and Breast, and for other Reasons) I thought it more prudent to take the following Method. I ordered a large Needle, with a Thread of a proper Size, to be passed under the Head of the *Os Humeri*, where the brachial Artery descends, through the little Flesh that remained near the Bone. A Ligature was then made with the Thread on the Artery and the remaining Flesh; then the Flesh was cut with the Scalpel under the Ligature, and the Bones afterwards sawed off in the usual Manner. This was done in the Presence and under the Direction of my Son, without the Help of the Tourniquet: And with such Success, that the Wound, after the Amputation, bled but little (which is uncommon in these

* In his *Operat. Chirurg.* Tom. III. near the End.

Cases and healed to our Wish, the Woman being still alive and in Health. Which singular Case was published by my Son the same Year; and this Practice there recommended in many other Cases, particularly in stopping Hæmorrhages of the brachial and crural Arteries: As may be seen more at large in his Treatise on the new Method of Amputating the Arm.

An EXPLANATION of the FOURTEENTH PLATE.

- Fig. 1.* Shews the Manner in which the Patient, Surgeon, and Assistants are to be placed for amputating the Hand, or Arm. A denotes the Patient, B the Surgeon amputating with the Saw; C the Assistant extending the Hand, D another Assistant holding the Arm; E the Assistant who holds the Patient's Body, and takes Care of the Tourniquet; F denotes the Dish or Vessel placed underneath to receive the Blood.
- Fig. 2.* Represents the Position of the Patient, Surgeon, and his Assistants amputating the Leg. A denotes the Patient seated in a Chair; B the Surgeon; C the Assistant who holds the Foot below the Calf; D the Assistant who holds the Leg above the Knee: E a Vessel placed on the Floor, to catch what little Blood may be spilt in the Operation.
- Fig. 3.* Denotes the most convenient Part for amputating the Leg at A, and the Thigh at B. But when the Disorder has extended itself higher up in the Thigh, it must be amputated proportionably above this Mark, though the Operation is then so much the more dangerous.
- Fig. 4.* Represents the Thigh A, with the Leg amputated B, in which may be seen the Part for fixing the Tourniquet C D, for amputating the Foot in the Tarsus or Metatarsus. The Tourniquet thus applied may also serve for amputating the Leg or Thigh, though not so conveniently as when placed higher up. In this Figure you have also a View of the divided Artery extended a little by the Pliers E, and going to be tied to the Ligature and Knot F. There are some indeed who do not approve of this Manner of tying the Ligature: But I have often experienced that it thus answers very well^a.
- Fig. 5.* Describes the Manner of amputating the Leg, so as to preserve the Calf. The Line A B denotes the first Incision to be made by the Scalpel, *Tab. XIII. Fig. 1.* or *Fig. 3.* The Line B C is the Course of the second Incision, by which the Flesh of the Calf is separated from the Bones of the Leg. C D the Place, where the Bones and rest of the Leg are amputated. Some reverse this Course of Incision, and first perforate the Calf with a double-edged Scalpel, *Tab. XIII. Fig. 3.* in Line C, and then they direct the Knife in the Course B A. But the first Method is, in my Opinion, most eligible.
- Fig. 6.* Represents the Manner of reflecting back the Calf of the Leg towards the Ham, after it has been separated from the Bones of the Leg by Incision: which done, the Surgeon next incises the Integuments, Flesh, and Periosteum in the Line B, and then saws off the Bones there.
- Fig. 7.* Denotes a Leg just amputated with the Calf A depending, to see the Ends of the two Bones: B the Tibia, and C the Fibula.

^a GARENGEOT finds Fault with this Method, *De Instrument. Chirurg.* Tom. II. p. 219. But LA MOTTE, another of our most eminent modern Surgeons, very much approves of it.

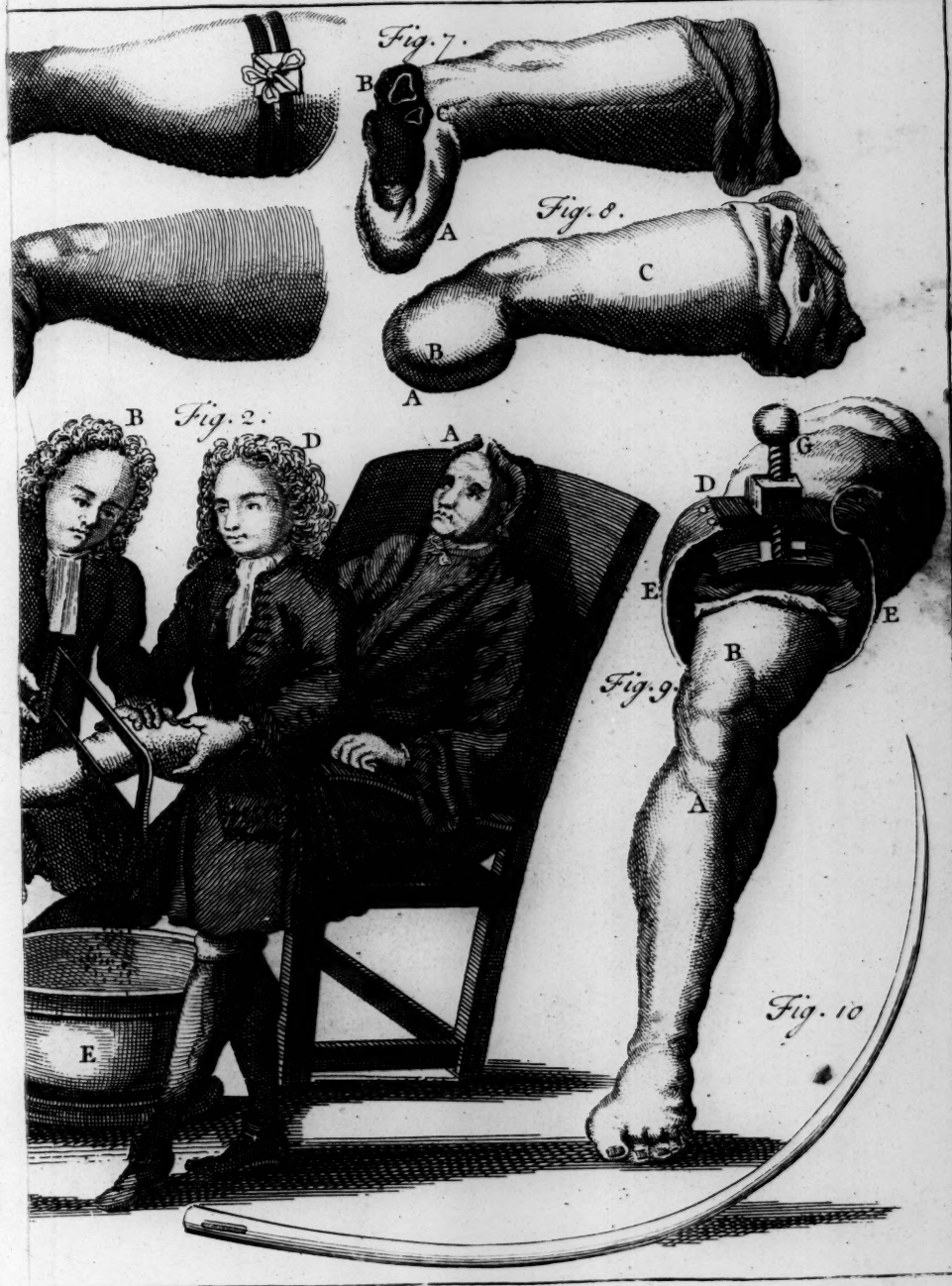


Plate 14.



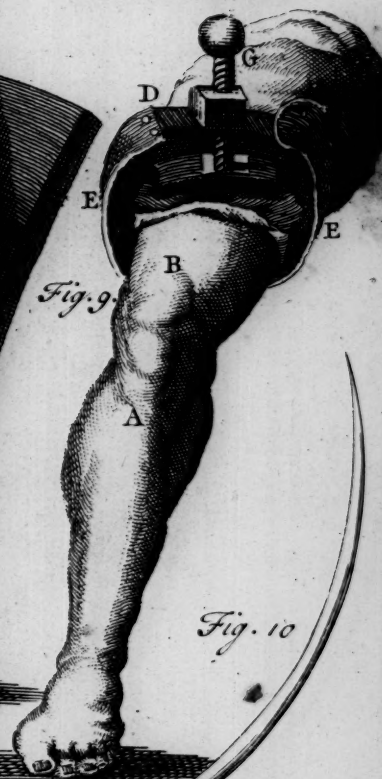
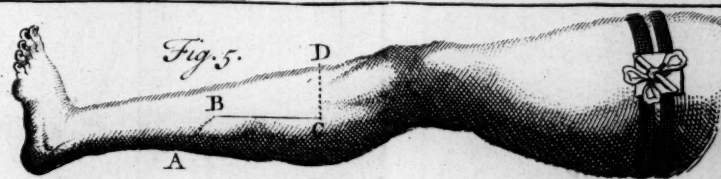


Fig. 8. Shews the Leg thus amputated, with the Calf A brought over and joined to the Stump B: C denotes Part of the Thigh.

Fig. 9. Represents the Method of applying the Screw Tourniquet (*Tab. V. Fig. 6. or Tab. VI. Fig. 1.*) above the Knee; A denotes the Leg; B the Thigh; CC the Prefs of the Tourniquet with its subjacent Pillow; D the Place where the leathern or filken Strap E E is fastened by Studs on one Side, and by the Hooks F on the other Side; G the Screw, by turning which the subjacent Artery is compressed in the Ham.

Fig. 10. Is a large crooked Needle for making a Ligature on the brachial Artery before the Arm is amputated in its Articulation with the Scapula, though the same may be also performed by the strait Needle, *Tab. XVIII.* either of which Needles will also serve for making Setons in the Neck.

PART II. SECT. II.

Of OPERATIONS belonging to the HEAD.

CHAP. XXXVIII.

Of making ISSUES upon the CORONAL SUTURE.

ISSUES are sometimes made in the Scalp of the Head upon the Meeting of the coronal with the sagittal Suture: But this Operation is not so frequent in Germany, as in Italy and Holland. Some Physicians think Issues in this Part can be of little or no Service, being not able to discharge any Humours from the internal Parts of the Head: And others again assert them to be of very great Efficacy, for the Truth of which they appeal to daily Experience. So that if we may confide in Experience, and the Authorities of able Physicians, we must readily acknowledge that Issues, made in this Part of the Head, may be highly serviceable in Vertigo's, obstinate Head-achs, Apoplexies^a, Epilepsies^b, Amaurosis^c, Stupidity, or Forgetfulness^d, with many other Disorders of the Head, and particularly of the Eyes and Ears, Defluxions, or Catarrhs.

II. To ascertain the proper Place of the Scalp for making these Issues, the antient Physicians^e direct to shave the Head, and then to measure with two Threads, one extending from the Nose to the Neck, and the other across the first to each Ear: By which means the Point where the Threads touch, or cross each other, will denote the Place where the Coronal and sagittal Suture meet; and is therefore the fittest Place for making your Issue, as you may see in the Figures of SCULTETUS, *Tab. XXVI.* MEEKREN, *Obs. Cap. V.* and DECKERS,

^a SCULTETUS, *Obs.* 34.

^b See a remarkable Instance in MEEKREN, *Obs. Chir. Ch. V.*

^c See DECKER's excellent Method in the Amaurosis and Epilepsy. *Exercit. Pract.* p. 109.

^d SLEVOGLIUS Dissert. of an Issue in the coronal Suture, as a Cure for a decayed Memory.

^e See CELSUS, *Lib. VII. Cap. 7. N. 15.*

^f *Exercitat.*

Of ISSUES on the CORONAL SUTURE. Part II.

Exercitat. Pract. pag. 110. But after all, it must be owned, that this Method of assigning the Place, or Meeting of the Sutures, cannot be certainly relied upon, because of the great Variation there is in this Respect in different People. Nor is it of any Consequence whether your Issue be made exactly over the Meeting of the Sutures or not; since the Matter discharged by it in both Cases, comes rather from the external Integuments of the Cranium, than through the Sutures from the Brain, as the Antients falsely imagined. It was also a Notion equally wrong, that the Antients entertained of this Part of the Cranium being thinner, and more perspirable, than the rest. Though it must be confessed, that Infants, whose Bones are not completely ossified, have this Part soft and membranous, which is usually termed in them, the *Fontanel*, or open Mold: Yet in Adults, this upper Part of the Cranium is almost constantly ossified like the rest of the Skull, and frequently the Bones are even harder or thicker here than in other Parts. But these we find were the groundless Reasons, which induced the Antients to make their Issues upon the Meeting of the Sutures. But if the Surgeon will be scrupulously exact in this Respect, he may pretty certainly discover the Meeting of the Sutures, without the forementioned *Apparatus*, of measuring by Threads, if he well considers the Course of them in dry Skulls, and feels carefully with his Finger upon the Scalp and Pericranium. For in most Patients the Meeting of the Sutures is sensible to the Touch, either by a small Cavity or Protuberance; upon either of which you may venture to make your Issue.

The Methods of making Issues in the Scalp.

III. To render Issues in this Part more efficacious, they are usually made by the actual Cautery. In order to which the upper Part of the Scalp is first to be shaved, and then the red-hot Iron is to be strongly pressed by your Hand, so as to burn through the Integuments upon the Part assigned, till you come to the Bones, or naked Cranium. The cauterizing Iron for this Operation may be of two Kinds: The first of which is without a Case, as we have given you a Figure of it in *Tab. III. Fig. 9.* taken from MEEKREN and DECKERS; the other, taken from AQUAPENDENS and SCULTETUS, is furnished with a Steel Case, or directing Tube, as we have represented it in *Tab. XV. Fig. 1 and 2.* But that the Force of the Cautery may not be extinguished by the Integuments before it has reached the Cranium, it may be convenient for the Surgeon, first to make an Incision either longitudinal^a or cruciform through the Skin, and opening the Lips of the Wound, insert the Tube at *Fig. 2.* that, by pressing the Cautery, *Fig. 1.* through it, you may at the first Time burn into the very Bone^b. But in whatever manner you make the Issue in this Part, it must be immediately dressed afterwards with a Pea dipt in some digestive Ointment, to be retained by a square Plaster and the four-headed Bandage, applied as we shall direct in treating of Bandages. For the rest, you may consult what has been before said of Issues in general at *Chap. XIX.* preceding. In order to credit the good Effects which many able Physicians affirm they have experienced from this Sort of Remedy, in many obstinate Disorders of the Head, it must be considered, that though there is no immediate Discharge hereby made of pernicious Humours from the Brain, yet the Cauterization makes so strong a Revulsion,

^a See CELSUS, *Lib. VII. Cap. 7. N. 15.*

^b Thus MEEKREN, in his Figure, expresses an Incision before the Application of the Cautery; but says nothing of it in the Description.

and

and the Pain it excites gives so strong a Stimulus to the Vessels, as frequently to remove Obstructions, and the inveterate Pains they have occasioned, even in one Instant. For more concerning the Uses of Issues in this Part, the Reader may consult, besides the forementioned Authors, MARC. DONATUS, *Lib. II. Hist. Miral. Cap. 4.* M. A. SEVERINUS, *Pyrotech. Chirurg. Lib. II. Part I. Cap. 6.* RIVERIUS *Cent. II. Obs. 93.* AQUAPENDENS, *Oper. Chirurg. Cap. I.* CLAUDINI *Respons. de Cauterio in Sutura Coronali, &c.*

CHAP. XXXIX.

Of ARTERIOTOMY in the TEMPLES.

I. **A** RTERIOTOMY, as the Word imports, is the Apertion of an Ar- Arteriotomy
described.
tery with a sharp Instrument, in order to extract a proper Quantity of Blood, for the Recovery of a Patient; performed almost in the same Manner as bleeding in a Vein. Though this Operation is not so often performed at present with us, as it was formerly among the antient Surgeons, for fear of the profuse Bleeding, or an Aneurism, which may be occasioned by wounding this Vessel; yet, if it be well adapted to the Patient's Disorder, and skilfully performed, it may be very often of the greatest Service, and yet not attended with any bad Consequences. We read of the Apertion of Arteries made by the antient Physicians in various Parts of the Body; as in the Forehead, Temples, behind the Ears, in the Occiput, betwixt the Thumb and Fore-finger, &c. where-ever the smaller Arteries lie fair for Incision, so that their Pulsation may be perceived by the Finger through the Skin. But among the modern Physicians and Surgeons we hardly ever meet with this Operation performed in any other Parts but the Temporal Arteries, which may be opened by the Lancet without much Difficulty or Danger, as they lie very near the Skin, so as generally to be very perceptible to the Touch; and, being resisted by the *Os frontis*, on which they are incumbent, they may be very easily compressed, to prevent any profuse Hæmorrhage, or dangerous Aneurism. But even here every prudent Surgeon must own, it is much more difficult to make a fair Apertion of an Artery, than of a Vein; because they seldom appear visible through the Skin, and then you have no other Guide but their Vibration on the Finger. We shall not here enlarge upon the extraordinary Artifices which we read to have been used for Arteriotomy by the antient Surgeons, because they are now obsolete. We shall, in this Place therefore, only describe the Operation with its Dressings and Uses, as they at present obtain among our modern Surgeons and Physicians.

II. First, the Patient must be seated conveniently with his Head inclined to either Side against the Light, that the Surgeon may the better discover the Ar- The Method
of Opera-
ting.
tery, in order to which he had best place the two foremost Fingers of his left Hand upon the Artery, at a little Distance from each other, as he will be directed by its Pulsation; and observing well the Course or Direction of it within that Space, to dip the End of the Lancet carefully into it betwixt his two Fingers. But it will be here necessary to incise deeper, as the Vessel lies lower, than in Phlebotomy. You must also enlarge your Incision more, by elevating the

the Point of your Lancet as you draw it out: Nor need you be afraid of cutting the Artery quite in two; for it will not be attended with any bad Consequences after Compressure and Deligation. If now the Blood follows your Lancet in a very florid and salient Stream, starting at every Pulsation of the Vessel, you may be satisfied the Artery is well opened: Otherwise you must repeat your Incision, till your Lancet has either divided or opened the Artery, which you may know by the forementioned Signs. But as the small and thin Point of the ordinary Lancet may be easily broke off against the Bone, I have experienced the Scalpel, *Tab. I Fig. G.* to be more convenient; especially if your Incision be downward and not upward. But to do the Patient any considerable Service by this Evacuation, you should bleed him plentifully; that is, to take about a Pound of Blood, or a Pound and half, or more, if he be plethoric, otherwise your Operation will be of little or no Benefit. Therefore we need the less wonder at the Practice of the Antients, whose Method was to bleed the Patient in this Manner till he fainted. If you are desirous of opening an Artery in the Occiput, or behind the Ears, rather than in the Temples, your Operation may then be conducted in the Manner we have now described.

Deligation.

III. When a sufficient Quantity of Blood has been taken, your Deligation must be made with three square Compresses, each larger than the other; laying on the smallest first, in which must be included a Farthing, a bit of Lead, or a Pellet of chewed Paper, to compress the wounded Artery against the subjacent Bone. Your other two Compresses being laid over the smallest according to their Size, they must be there firmly retained and secured by the *Fascia nodosa*, which we shall describe at large when we come to treat of Bandages at the latter End of our Surgery. The Head thus properly invested with your Bandage, must continue so at least a Week or eight Days before you take it off, to prevent a profuse Bleeding, or an Aneurism: And if the Deligation should, within that Time, get too loose, it must be tightened again, and continued till the Cure is completed.

The Uses of Arteriotomy.

IV. The Uses of Arteriotomy are so many and considerable, that not a few Physicians recommend it as the last Refuge in many Diseases of the Eyes, and the most obstinate Disorders in the Head, from whence the Patient will often find Relief when all other Means have been tried in vain; especially when they are caused by too great a Fulness of Blood. Experience can best testify the good Effects of Arteriotomy in Vertigos, obstinate Head-achs^a, Epilepsies, Suffusions, and Inflammations of the Eyes, and most of the other plethoric Symptoms which attack these Parts. But particularly in Apoplexies, it has been lately demonstrated, in a professed Treatise on the Subject^b, to be the most effectual and expeditious Method of relieving the Patient. I shall therefore leave the prudent Reader either to countenance or condemn the Opinion of those who think *Ar-*

^a LANZONUS confirms the good Effects of Arteriotomy in obstinate Head-achs, Madness, Epilepsies and Diseases of the Eyes, *Ephem. Nat. Cur. Cent. III. p. 142.* It is also approved by BARBETTE, and much extolled by SEVERINUS, particularly in the Epilepsy. In a most obstinate Cephalæa I have found it effectual.

^b By CATHERWOOD, entitled, *A new Method of curing Apoplexies*; notwithstanding which, the Operation has been twice performed by me on two apoplectic Patients, the one an old and the other a young Man, but without the expected Success; for they both died soon after, though the Operation was made in the Beginning of the Disorder, and assisted with other proper Remedies; from whence we see, that *Arteriotomy* will not always cure Apoplexies.

teriotomy too dangerous to be put in Practice, and even then of no more Use than Venesection: Since the Uses and Effects of it are attested by the Observations and Experience of our best Physicians, and the Danger of it may be totally removed by proper Compresses and Deligation; yet, I must own, that, with regard to the Reputation and Character of a young Physician or Surgeon, it may be generally adviseable to defer this for the last Help, in Cases which will admit of Delay. After all, it will be equally necessary to assist this, as well as many other Operations in Surgery, by ordering a proper Diet, Regimen, and Medicines adapted to the Patient's Disorder, if we expect to make any considerable Cure.

C H A P. XL.

Of the HYDROCEPHALUS.

I. **HYDROCEPHALUS** is a preternatural Distention of the Patient's Head to an uncommon Size by a Stagnation and Extravasation of the Lymph: Which, when collected within-side the Bones of the Cranium, the *Hydrocephalus* is then termed *internal*; as it is *external*, when retained betwixt the common Integuments and the Cranium. The first Kind of the Disorder is seldom to be met with but in Infants, who contract it whilst they are in the Womb, or in a difficult Birth. Among others, the Reader may consult, on this Head, WEDELIUS, *De Morb. Infant.* pag. 47. and RUYSCH, in *Theaur. Anat.* II. Tab. III. which last has given a very ample Account of this Disorder. It generally appears in the Infant whilst young and new-born: But if it has advanced to any great Degree, it is a dangerous Case, and generally incurable. For if you make a Paracentesis in the Head, to discharge the Lymph, your Operation is no sooner performed, but the Infant dies, as Physicians have been too often well assured by Experience. If the Disorder be in its first Stage, and but beginning to shew itself, it will be most adviseable to try what may be done by Medicines; such as gentle and repeated Purges, to draw the Humours downward with corroborating Medicines internally. Externally you may apply to a good Purpose a large Compress round the Head, dipt in warm *Aq. Calcis & Sp. Lavend. vel Aq. Reg. Hungar.* This Compress must be retained by a proper Bandage, termed the *Reflex Capeline*, which is described in the *Third Part* of our System treating on Bandages.

II. In the external *Hydrocephalus*, as we observed, the Humours are lodged betwixt the external Integuments and the Cranium. Hence you may distinguish this Species by the Softness of the Head and Skin externally. But in the internal *Hydrocephalus* the Head feels as hard as usual, though it is much more distended and enlarged: The Reason of which Appearances is manifest from what we said in the last Paragraph. Though the external *Hydrocephalus* is not without Danger, yet it may be much more readily cured than the internal Species; but the more difficultly as it is of a longer standing. The Cure must be attempted as well by internal as external Remedies at the same Time. Apply Cathartics, Diaphoretics, Diuretics, attenuating and strengthening Medicines for internal Use: And externally, a Compress dipt in the Fomentation beforementioned for the internal *Hydrocephalus*. Or, you may apply those Waters and

C c c

Spirits

Spirits to the Head, together with discutient Caps or Bags filled with the Tops of dry *Majorana*, *Origanum*, *Serpillum*, *Pulegium*, *Chamomilla*, *Salvia*, *Rorismarina*, *Lavendula*, &c. warming them before you secure them on the Head by the proper Bandage. HILDANUS writes, that he happily cured an *Hydrocephalus* barely with the repeated Application of *Aqua Calcis* as a Fomentation by means of a Sponge. To the forementioned Remedies we may add an Errhine, or cephalic Snuff, composed *ex summit. Marjoranae, Lil. convall. Mari veri, Hippocastan, Nicotiana, &c.* Add to these the repeated Chewing of Tobacco in the Mouth, to discharge the Serosities from the Head by Spitting. Lastly, some foment the Head with the Fumes of burning Spirit of Wine highly rectified. But if all these Means prove unsuccessful, Recourse must then be had to chiro-surgical Helps: Among which, you ought, first, to try a large Blister, applied behind the Ears, on the Occiput and Neck. If this does not altogether answer your Intention, you may add Scarification and Cupping upon the same Parts. PISO relates, that he cured a Man of an *Hydrocephalus*, by making Issues in the Neck: And therefore Setons, one of which will effect as much as two Issues, may be here also highly serviceable. When all other Means have been used in vain, some of the Antients advise a deep transverse Incision to be made at the Bottom of the Head or Occiput: Which I cannot approve of, as it may easily wound, or even totally divide, the Blood-vessels and Muscles there seated. But as this Danger may be avoided by deep Scarification and Cupping upon the same Parts, the Discharge that way may be equally serviceable, and much more commodious. The Parts scarified are to be afterwards dressed with Lint, spread with some digestive Ointment: adding sometimes a little *Præcipitatum rubrum*, to keep up the Discharge. When the Disorder is thus removed, you heal it up with some vulnerary Balsam, keeping the Patient, for a considerable Time, in a Course of proper internal Medicines, and under a suitable Diet and Regimen. Histories of this Disorder are given in PAREY, LUSITANUS, KERKRINGIUS, and others. But particularly VESALIUS relates, that he found nine Pounds of Serum in the Verticles of the Brain, in a Subject who died with an *Hydrocephalus*, *Anat. Lib. I. Cap. 5.*

C H A P. XLI.

Of TREPANNING the CRANIUM.

When the
Trepan is
necessary.

I. **T**REPANNING is universally understood to be a Perforation, or Opening made in the Bones of the Cranium by a kind of *Terebra*, or round Saw, which has its Name from the Greek Word *τρέω*, and by the Latins called *Modiolus*. This Operation was performed by the Antients, not only in Fractures and Depressions of the Cranium, but also in those other obstinate Disorders of the Head and Brain, which could not be relieved by internal Medicines, and the Use of Issues upon the coronal Suture: By which means they thought to give a more immediate Vent to the offending Humours. But the modern Surgeons never use the Trepan at present for internal Disorders of the Head;

Head^a; though they seldom neglect it in Fractures and Depressions of the Cranium, caused by Blows, Falls, Bullets, and other external Injuries. They also frequently apply it in Fractures and Fissures of the Cranium, to discharge extravasated Humours, which, by injuring the Brain, might occasion the Death of the Patient. The Trepan is therefore useful, not only in these Cases, to elevate the depressed Parts of a fractured Bone in the Cranium, for which you may consult *Part I. Book I. Chap. XIV.* but also the most fatal Symptoms, and Death itself are avoided, by discharging the extravasated Blood through an Aperture made by this Instrument. It is well known, that the Bones of the Cranium are often fissured, and the adjacent Blood-vessels, lacerated by external Injuries, without any apparent Fracture or Depressure of them; so that if the extravasated Blood be not removed by the Trepan, by pressing on the Brain it will greatly injure, if not totally destroy its several Functions. The Consequences of neglecting this Instrument in such Cases will be Restlessness, Delirium, Convulsions, Vertigo, Apoplexies, Stupidity, with a Loss of the Senses, Speech, and voluntary Motion, and at last Death itself. Sometimes only the milder of these Symptoms appear, and in but small Degree, when the Head has been injured by external Violence: But in some time afterwards, when the Blood or Humours have been accumulated, the most fatal Symptoms do then gradually approach, and even threaten the Life of the Patient. But if Death is not the immediate Consequence, as there is no natural Vent for the extravasated Blood or Lymph, it must consequently putrify, and, by corroding the Brain and its Membranes, will inevitably destroy the Patient in a little Time, if it be not prevented by a judicious Application of the Trepan, for discharging the offending Matter. This Instrument therefore ought never to be neglected in urgent Cases of this Nature.

II. The less Time you lose, the better, before the Application of the Trepan: But in the Operation itself you must go on slowly and carefully. For it is extremely difficult, if not impossible, for you to take out a Piece of the Cranium by this Instrument, without injuring the subjacent *Dura Mater*, to which it is most intimately attached, so as to be often in some Degree wounded, though you use the greatest Circumspection. For this Reason I am induced to condemn the Advice of those^b, as very unsafe, who direct to trepan the Cranium immediately upon every slight Disorder of it. I should therefore advise you, with CELSUS, and most of the Moderns^c, to try first the Use of other Remedies, both external and internal, as Phlebotomy, Purging, Clysters, discutient Bags, &c. rather than immediately to subject the Patient to the Trepan, before you are convinced it is absolutely necessary^d. But you may see more upon this Head in *Part I. Book I. Chap. XIV. Sect. XXXVI, & seq.* where we treat of Wounds in the Head. On the other hand, there are many Cases, in which

The Trepan
not to be
used hastily.

^a Though indeed there is an Instance related in the *Mem. Acad. Paris. Chirurg.* where an obstinate Head-ach was cured by Trepanning, *Tom. I. p. 226.* But there follows another, *p. 227.* where the Operation failed in a similar Case.

^b See FIENUS *De Trepanatione*, and BOHNIVS *De Trepanationis Difficultatibus.* Likewise ROONHUYNS, *Obs. I. p. 1.*

^c Among which are CÆSAR MAGATUS, *Lib. II. De Vulneribus, Cap. 41.* and DIONIS in *Chirurg. Operat.*—CELSUS, *Lib. VIII. Cap. 4.*

^d See some excellent Observations on the Use of the Trepan in dangerous Cases, *Mem. Acad. Chirurg. Gallic. Tom. I. p. 188.*

Delay may be of the most fatal Consequences ; where, being convinced of the Insufficiency of other Remedies, you ought immediately to have Recourse to the Trepan, in order to elevate or remove the depressed or fractured Parts of the Cranium, and to discharge the Humours extravasated internally.

The Event
of the Ope-
ration
doubtful.

III. The Surgeon can hardly ever be certain of the Success of this Operation : Because he cannot be previously assured in what Manner or Degree the Brain, and its including Membranes, are injured, the Disorder generally turning out worse than its Symptoms indicated. Therefore we need the less wonder that most Patients miscarry after the Use of the Trepan, not from the Operation, but the Violence of their Disorder, or the Injury received. And some there are, who, being much better after the Operation, appear seemingly in a fair Way for Recovery, and yet miscarry beyond all Expectation. Upon Enquiry made after the Causes of this unexpected Disappointment, and sudden Death of the Patient, they appear chiefly to be two: Either from, 1. an Inflammation or Suppuration of the Brain and its Membranes, from the Putrefaction of some Blood or Matter that could not be discovered or discharged ; or, 2. from some Insult of the Blood on the Parts affected, by Irregularities committed by the Patient in the Non-naturals, either in Drinking, and bad Diet, (or by an unwholesome Air^a) or by Frights, Anger, Venery, or other intense Passions, &c.

What Parts
of the Cra-
nium may
be trepan-
ned, and
what not.

IV. But before we proceed to acquaint the young Surgeon with the Method of performing this Operation, it will be previously necessary to point out to him, upon which Part of the Cranium it may be convenient for him to apply the Trepan. And, in general, the Place where the Fissure appears, will be most convenient for the Trepan, if nothing contra-indicates. But, in Fractures, it will be proper to trepan a little below the injured Part, that the extravasated Humours may be more easily discharged : Yet, if the Fragments of the Bone can be removed, so as to make Way for the Extraction of the Blood and Splinters which injure the Brain, the Use of the Trepan may be in that Case neglected. It must be next observed, that there are several Places in the Cranium, which ought not to be in any Case trepanned : As, 1. upon the Sutures where the Bones meet with each other, especially upon the sagittal Suture, as HIPPOCRATES has long before observed ; because, in these Parts, the *Dura Mater* is more strongly attached to the Cranium, and under the sagittal Suture runs the longitudinal Sinus of the *Dura Mater*, which, by trepanning in this Place, might easily be injured, to the Hazard of the Patient's Life. Yet, in Cases of urgent Necessity, the Trepan may be used upon the coronal Suture, and sometimes upon others. Instances of which may be seen in CARPUS, *Lib. de Fract. Cranii*, HILDANUS, *Obs. I. Cent. 2.* 2. It is equally dangerous to trepan the Cranium in the Middle of the *Os Frontis*, especially in that Part which forms the Fontanel : Because under these is seated the forementioned Sinus of the *Dura Mater*, which might easily be wounded by the Instrument. 3. The Trepan must not be applied upon any of the Sinuses of the *Os Frontis*. 4. Nor ought it to be used where any large Vein or Artery spreads itself. 5. If the fractured Part of the Bone, upon which you fix the Trepan, is loose or carious, you might then injure the Brain by this Instrument. 6. It has been judged improper to trepan

^a It has been observed by the French Physicians, that Trepanning has failed in many Hospitals, on account of the Impurity of the Air. *Mem. Acad. Chirurg.* Tom. I. GUILLEAM. also relates, that this Operation generally proved fatal in Paris, though successful in other Parts of France.

in the lower Parts or Basis of the Cranium, which are invested with Muscles, as about the Occiput and Temples: Though the Moderns find that the Trepan may be very well used, and even applied upon the lower Parts of the Cranium, and upon the temporal Bones, after the Muscles have been freed from them ^a.

7. Lastly, it will be improper to trepan upon the cruciform Eminence of the *Os Occipitale*. Notwithstanding these Rules or Cautions, if a violent Fracture should happen in or near the forementioned Places, you ought to trepan as near to the affected Part as possible: And if the Fracture has passed a-cross the Sutures, you must trepan within a Finger's Breadth of the Suture on each Side. Sometimes it is impossible to discover the particular Part of that Cranium, which is injured; the Patient, in the mean time, being afflicted with the most urgent and dangerous Symptoms, such as Vomiting, Drowsiness, Convulsions, Fever, Bleeding at the Nose and Mouth, with the Loss of his Senses and Speech. In these Cases, it will be necessary to trepan first on the Right Side, then on the Left, afterwards upon the Forehead, and lastly, upon the Occiput, and so round till you meet with the Seat of the Disorder. For it is much better, in these desperate Cases, to try a doubtful Remedy, than none at all, as CÆLUS ^b rightly advises, that the Surgeon may not be accused of having neglected any thing which might conduce to the Recovery of the Patient. You must not think it a new or uncommon Practice to make several Perforations in the Cranium after one another by the Trepan: For, in many Cases, we meet with extravasated Blood or Splinters of the Bone, which require the Use of the Trepan in other Parts, besides where the Wound itself manifestly appears. Therefore the Operation must be repeated, till you can discover and remove the Cause of the Disorder: So that it is no Wonder to meet with three or four, nay seven or twelve Perforations in the Cranium, made by the Trepan, in the same Patient. Of which we are furnished with many Instances, particularly in SCULTETUS, *Obs.* 7. GLANDORPIUS *Speculum Chirurg.* *Obs.* 3. p. 46. to which add DIONIS in his Operations, and many others. But what is more, we read of the Trepan being applied twenty-seven different Times with Success upon a Count of NASSAU, in STALPART. VANDER WIEL, *Cent.* 1. *Obs.* 8.

V. After having pitched upon the Part to be trepanned, your next Business is, to shave the Scalp, and make an Incision through the Integuments, to lay bare the Cranium, except it should have been already done to your Hand by the Wound. The Incision of the Integuments may be made in the Form of a Cross \dagger , or in the Figure of the Letter X, V, or T, large enough to admit the Crown of the Trepan upon the Bone. After your Incision is thus made, you must elevate and separate the Integuments and Periostæum from the Cranium by the Edge and Handle of the Scalpel: And having wiped off the Blood, you must insert a large Quantity of scraped Lint, to dilate the Wound, and compress the divided Vessels, in order to diminish the Hæmorrhage, which indeed, though profuse, may, in many Patients, be serviceable. A Compress must be next applied, dipped in *Sp. Vin. Aq. Calc.* or *Sp. Vin. Camphorat. calid.* to be retained by the Kerchief Bandage. Thus the Patient is to be left, if the Dis-

^a See ROUHALT *De vuln.* *Cap.* p. 91. & seq. and SAVIARD, *Obs.* 27. p. 136.

^b In *Lib.* II. *Cap.* 10. To which we may add the Sentence of HIPPOCRATES in *Aphor.* vi. Sect. 1. *Desperate Disorders require desperate Remedies.*

order will permit, for a few Hours, that the Blood may be stopped before you apply the Trepan: Otherwise the Work will be so much obscured, that you cannot see what you are about. Yet if any Delay will be dangerous, you ought to apply the Instrument immediately: Before which, if the Hæmorrhage be great, you may secure the Ends of the divided Arteries by Ligature with a crooked Needle and Thread. But if you are in great haste, the Hæmorrhage must be suppressed for the present by the Fingers of an Assistant pressed upon the Part.

Apparatus of
Instruments
and Dress-
ings.

VI. We come now to the Apparatus of Instruments and Dressings, which must be provided before you enter upon the Operation. The first and principal is the Trepan or Terebra, with its Crown, *Tab. XV. Fig. 3.* Some of the Antients used a Trepan made in the Shape of a common Gimlet, according to the Figures of FABRICIUS AB AQUAPENDENTE, ANDREAS A CRUCE, and SCULTETUS (*in Officina Chirurg. pag. 14, & seq.*) *Tab. II. Fig. 7, &c.* which Instrument they applied with one Hand; from whence it was usually denominated the Hand-Trepan. But, as this Instrument labours under many Defects, which renders the Application of it less commodious, the Moderns, at present, use a Trepan like that presented in *Tab. XV. Fig. 3.* with a Handle turning round, like that used by Coopers, which is much more commodious than the antient one; especially if the Crown of it be not made cylindrical, but broader above than below, in the Shape of an inverted Cone, as it is represented in *Fig. 3. A.* By which means the Instrument, meeting with more Resistance as it descends further through the Bone, is not so liable to rush in upon and wound the Brain. The Instrument contrived in this Manner is, by some, termed the Trepan of HILDANUS, though it was known and described by CELSUS^b, and others of the Antients, long before HILDANUS. The Crown of this Instrument, marked A, is joined to the lower Part of the Handle B, by a Screw, so that it may be taken off and put on at Pleasure: Or else, that a Crown of another Size may be screwed in its Place, since it will be necessary for the Surgeon to be provided with Crowns of different Sizes. The Connection of the Crown, with its Handle, is, by some of our modern Surgeons, made in a different Manner from that here represented, but with no great Advantage, in my^c Opinion; since that of the Make here represented, is found to answer most Purposes conveniently enough. The Trepan is distinguished into Male and Female: In the first of which the Crown is furnished with a sharp Point or Pyramid A. But when the said Point or Pyramid, *Fig. 4.* is taken out by the Winch, *Fig. 5.* the Trepan is then termed Female. You must next be also provided with a Scalpel of a particular Make, with a round and flat Head, as represented at *Fig. 6.* which is, by some, denominated the lenticular Scalpel: To which add another Instrument for gradually depressing the *Dura Mater*, of the Shape represented at *Fig. 7.* You must be also provided with a perforating Instrument, *Fig. 8.* which must be screwed into the Cavity B of the Handle *Fig. 3.* Also a Hair Brush, like that represented at *Fig. 9.* with a smaller Terebra or Wimble, like that in *Tab. VII. Fig. 7.* a Lancet, an Elevator, *Tab. VII. Fig. 7, 8, and 14.* a Tooth-pick made of

^a See also AMB. PAREY, *Lib. IX. Cap. 18.* where he gives such a Figure of the Crown of this Instrument.

^b *Lib. VIII. Cap. 3.*

^c *Vid. GARENGEOT Tract. de Instrument. Tom. I. pag. 115.*

a Quill, a Probe with a sharp Point, some Dossils of Lint: And, lastly, a Vessel with some *Spirit. Vin. rect.* all which are to be placed in order in a large Dish or Plate, that they may be ready to the Surgeon's Hand in performing his Operation. The Apparatus of Dressings and Bandage to be applied after the Operation, consists of a Dossil of Lint of an orbicular Figure, which must be tied round the Middle with a Piece of Thread, about a Span long, the Form of which is represented in *Tab. XV. Fig. 11.* Besides which, there must be added another round Bundle of Lint of a convenient Size, secured by a Thread like the preceding, as presented at *Fig. 12.* You must also have some Pledgits of Lint, *Fig. 13.* for recovering the other Dressings, and filling up the Cavity in the Cranium. To these add some *Mel. Rosar. & Tinct. Succin. vel Mastich.* some scraped Lint, a square Compress: And lastly, a large Napkin, or square Piece of Linen, to make the Kerchief or Bandage for the Head. All which Particulars are to be disposed in order upon one or two large Plates, that they may be readily found, and handed to the Surgeon as he wants them.

VII. The Apparatus being thus provided, we come next to the Operation itself. To perform it with a greater Readiness and Exactness, the Patient must be disposed in a convenient Posture upon a Couch, or some other low-Seat, in such a Manner, that the Surgeon and Assistants may have free Access to perform each their Part. This done, and the Dressings removed, the Wound is next to be cleansed from the extravasated Blood, or other Foulness: After which, you place the Head in a convenient Manner upon a Pillow, to be held fast by an Assistant. The Surgeon now takes the perforating Trepan, *Fig. 8.* which he adapts to the Handle B, instead of the Crown A, *Fig. 3.* so that by turning round the Handle D, he makes a small Entrance or Aperture with his Instrument, and then applies the Male Trepan with a Crown, *Fig. 3. A.* Upon the Top of the Handle C C, the Surgeon fixes his left Hand, upon which he places his Chin or Forehead^a, while with his Right Hand he slowly and carefully turns round the Handle, till the Crown of the Trepan, with its Spindle, have made a circular Entrance deep enough in the Cranium. Then he removes the Spindle, and continues his Work carefully with the Crown of the Trepan only, as long as he sees convenient, all the Saw-dust being first brushed off from the Cranium and the Teeth of his Instrument with Brushes of Hog's Bristles. He now continues to use the Trepan till the Saw-dust becomes bloody, which denotes, that he has penetrated the Diploë, or intervening spongy Part of the Cranium. But it is to be observed, that he will not always meet with this Sign, because in some Skulls the Diploë is wanting in the Part trepanned. However, when his Saw-dust becomes bloody, the Instrument must be directly laid aside, and, after washing away the Blood with a Sponge dipt in *Sp. Vin.* he then screws the small Terebra, *Tab. VII. Fig. 7. B.* by two or three Turns, into the small Aperture in the Middle of the trepanned Piece of Bone, and then takes it out again, making two or three more Turns with the Crown of his Trepan.

The Method of Trepanning.

^a Most Surgeons formerly placed their Forehead upon their left Hand, on the Instrument; but it seems to be a better Practice to lean the Chin as M. PETIT and GARENGEOT direct; because then the Operator has a better View of his Work.

Then

Then he examines with a Probe or Tooth-pick, whether the Plates of the Cranium are sufficiently sawed through; which cannot be better known, than by carefully attending to the Colour of the circular Groove or Division: For when that appears of a blue or grey Colour, which was before white, it is a Sign, that you have penetrated so far through the lower Plate of the Bone, as to render the *Dura Mater* almost conspicuous through it. The Trepan must therefore now be applied with greater Circumspection, lest the Saw-Teeth of its Crown should rush in upon and wound the *Dura Mater*, which might be attended with violent Inflammation and the most malignant Symptoms. But if the bony Plate appears livid in one Part of the circular Groove, and white in another, it is a Sign that the Trepan has not cut equally through; and therefore it must be inclined and pressed a little harder upon the whitest Parts, moving round the Handle slowly and carefully, till the Saw-Teeth of the Crown have cut deep enough to make the round Piece of Bone loose or moveable. In that Case it will not be convenient to cut totally through the Bone with the Saw-Teeth of the Trepan. To avoid wounding the subjacent *Dura Mater*, you should rather screw in the Terebra again, *Tab. VII. Fig. 7. B.* or some such Instrument, till you find that by pulling this upward with the Assistance of an Elevator, you can totally remove the round Piece of Bone.

The Treatment after Trepanning.

VIII. Having thus extracted the round Piece of the Cranium, the Blood usually follows it: Which being wiped off, the Surgeon is carefully to examine, whether there are any Fragments or rough Parts remaining to be extracted, or Depressions to be raised. If there are, you must do it immediately: If not, you must smooth the rough Parts about the lower Margin of the Aperture, by applying the headed Scalpel, *Fig. 6.* to prevent the *Dura Mater* from being pricked and injured by any of the sharp Splinters. This done, the Blood will more readily discharge itself: But to promote its Exit, you may gently incline the Patient's Head on one Side and another, tenderly and carefully pressing the *Dura Mater* itself, either by the Head of the Scalpel, *Fig. 6.* or the Depressor, *Fig. 7.* By which means the Patient is no sooner relieved from the Weight or Pressure of the extravasated Blood on his Brain, but he instantly begins to recover his lost Senses, either suddenly or by Degrees, like one just awoke out of a deep Sleep. When the Patient has thus recovered his Senses, and the Blood notwithstanding is in some measure retained, the Surgeon should direct him to fetch a deep Breath, and hold it with a Strain, like one that has a hard Stool. Others rather recommend violent Sneezing, provoked by Sternutatories, in order to force out the extravasated Blood: The Success of which, in my Opinion, must be very precarious, if not sometimes fatal.

When extravasated Blood, or a bony Fragment or Splinter are lodged under the *Dura Mater*.

IX. If the *Dura Mater* appears distended or elevated, and of a blackish blue Colour at the trepanned Aperture of the Cranium, it is usually a Sign that Blood or Matter are retained underneath it. Therefore there remains but one and a doubtful Remedy for it. Which is, to make a Perforation through the *Dura Mater* (as also the *Pia Mater* when the Matter lies so low) with a Lancet or Scalpel, to give Vent to the retained Blood or Matter, which will otherwise certainly prove fatal to the Patient, by eroding some of the larger Blood-vessels. I know there are some, who think the *Dura* and *Pia Mater* cannot be perforated without destroying the Patient, and therefore they forbid it.

it. But the Success of this Practice, if you avoid the larger Arteries and Veins, is confirmed, not only from my own Experience, but likewise the Authorities of ^aPAREY, ^bGLANDORP, ^cCOITER, ^dFALLOPIUS, ^eMAGATUS, ^fMARCHETTI, ^gROHAULT, ^hBLANCARD, and other creditable Writers, who testify, that many have had this Operation performed without Danger. If you meet with any bony Fragments or Splinters which irritate and wound the Brain, they must be carefully extracted, either by your Fingers or the Pliers: Or if any Parts of the Bone are depressed only, you must raise them by your Fingers, a Lever, or an Elevator adapted to the Purpose. When a Splinter is insinuated betwixt the *Dura Mater* and the *Cranium*, so that you cannot extract it by the first Aperture you made with the Trepan, a second or third Perforation must be made by the same Instrument, till you have removed every thing injurious to the Brain and its Meninges. Sometimes it will be necessary to cut off or remove the bony Fragments, by making a second Perforation into the first, like a half Moon, by the Trepan when the Fragments are strong, or by the small Saw (*Tab. VII. Fig. 9.*) by a Pair of cutting Forceps, or lastly, by the Mallet and Chissel, to be seen in the said *Tab. VII.* But, when the Fragments are thin and weak, you may remove them by the lenticular Scalpel, *Tab. XV. Fig. 6.* that you may afterwards extract or remove the vellicating Splinters. When there is a long Fissure in the *Cranium*, you may trepan upon each End of it: But when the Fissure runs in several Directions, you must trepan upon each, because every one of them has usually extravasated Blood or Matter lodged underneathⁱ.

X. Having described the Method of perforating the *Cranium* by the Trepan, and of discharging the extravasated Blood, Matter, and bony Fragments, we next proceed to the Dressings and Deligation. These are made, first, with a round Pledgit of dry Lint, *Fig. 11.* to be laid next the *Dura Mater*, with a Thread fastened to it, and hanging out of the Aperture, that it may be placed under and drawn out from beneath the *Cranium*: Upon which Pledgit of Lint is afterwards poured some *Mel. Rosar.* diluted with a little *Sp. Vini*; though there are some who recommend the Application of *Tinct. Mastich. Succin. &c.* which are, in my Opinion, too strong and acrid, because they often molest the Patient with violent Pain. You then lay on a like Pledgit of Lint, furnished with a String, as in *Fig. 12.* with other Dossils, till the Cavity is replete. In the next Place, the *Cranium* and Wound itself must be dressed with Lint, spread with some mild digestive Ointment, or *Mel. Rosar.* upon which add a square Compress dipt in warm *Sp. Vini*, or *Sp. Vini Camphorat. cum Aq. Calc.* and then you secure the whole, without a Plaster, by the Capeline or Head-Bandage, described in the End of our Surgery.

XI. In the subsequent Dressings, which must be repeated once or twice every Day, you must strictly avoid fat and oily Applications; which will destroy the Membranes and foul the Bones: Instead of such, you must apply balsamic and healing Topics,, especially *Mel. Rosar. cum pauco Sp. Vini, Tinct. Mastich. &c.*

^a Lib. ix. Cap. 21.
^{Capit. Cap. 48.}

^b Obs. Chirurg. 4.

^c De vuln. Lib. ii. Cap. 42.

^d Obs. Anatom. & Chirurg.

^e De vuln.

^f Obs. 14.

^g Pag. 83. 116.

^h Obs. Med. Phys. Cent. i. Obs. 27.

ⁱ The French Surgeons have described, and illustrated with Observations, a great Variety of Cases, where a frequent Repetition of the Trepan was requisite. *Mem. Acad. Reg. Chirurg. Tom. I. p. 251. & seq.*

The Wound being thus constantly dressed and attended, you will have an Exfoliation of a thin Plate from the trepanned Margin of the Bones, usually within forty or fifty Days, which ought not to be pulled away by Force. Your Exfoliation being obtained, there will then appear new Flesh and Callus, shooting up from the clean Bone and *Dura Mater*, so as at length to fill up the whole Cavity. By that Time you find the Cavity about half filled, you must moderately compress the sprouting Flesh and Callus by scraped Lint and Bandage, to prevent it from being too soft and lax: And when it is arrived even with the Surface of the Bones of the Cranium, you must endeavour to conjoin and extend the Integuments over it, by the Assistance of Sticking-Plasters; that the new-formed Substance may intimately unite with the superinduced Skin. This new-formed Substance, with which the Cavity in the Cranium is filled, becomes gradually more and more indurated: But so as even at last to resemble rather a Cartilage than a Bone, which, upon boiling the Cranium, separates, and falls out from the other Bones. And it is from the weaker Resistance of these cartilaginous Places that such as have been trepanned are subject to Disorders and Pains in their Heads, upon a Change made in the Weight and Temper of the Atmosphere: Though that Inconvenience may be partly remedied, by constantly keeping the Place armed with a Plate of Silver.

The Removal of Accidents.

XII. If a Vein should open itself so as to bleed profusely after the Operation has been performed with the Trepan, then you must sprinkle on some *Pulv. ex Bolo Armeno, Sang. Dracon. Thure & Colophon. &c.* compressing the Part for some time with Lint. But if the Brain or *Dura Mater* should be inflamed, you must apply discutient and cooling Topics externally, *Aq. Flor. Samb. cum pauc. Gutt. Sp. Nitri Dulc.* the Patient must also use Abstinence, with Phlebotomy, and cooling diluent Medicines internally. Even some (as ROCHAULT, p. 123.) recommend Scarification of the *Dura Mater* itself, before the last prescribed Mixture is applied. But, if a Suppuration should follow, so as exactly to form an Exulceration, the Surgeon must cleanse away the Matter, or Sordes, with scraped Lint, or by an Injection mixed with *Mel. Ros. Sp. Vini & Tinct. Mastich. Succin. vel Elix. prop. sine alcali vel acido.* If, after the Patient has been once trepanned, he perceives great Uneasiness and Disorder in some other Part of the Head, it is a Sign there still remains some foreign Body to be removed. Therefore the Trepan must be again applied upon the assigned Place. If any spongy Excrecence, or proud Flesh should rise up above the Level of the Wound upon the Cranium, it may be removed by some of the following Methods: Either by strong Depression with Lint dipt in *Sp. Vin. vel Tinct. Mastich.* and a tight Bandage, or by applying the round Piece of Lead, *Fig. 14.* contrived by BELLOSTE^a, and is, by some, made perforated, and furnished with Handles, as at *Fig. 15.* which is to be put into the Aperture of the Cranium, and well covered with round Pledgits of Lint: But you will seldom have Occasion for this Instrument, if the first Method be used. Or, lastly, if the Excrecence has already surmounted the Surface of the Cranium, it may be cut off, either by tying it round with a Thread, or with a Pair of Scissors, and the rest may be taken down with *Vitriol. Cærul. Pulv. Sabin. vel Alum. ust.* and for the future you must make a stricter Compressure and Deligation with more com-

^a See his Treatise, entitled, *Le Chirurgien d'Hospital.*

pack Dossils of Lint. By which means the sprouting Excrecence will be not only compressed and reduced, but the Wound itself will readily heal in a little Time. We have an Account of the Trepan being repeated to the eighth Time for a Caries in the Cranium, *Mem. Chirurg.* Tom. I. p. 262. There is another, of a successful Operation on the coronal Suture, and the Repetition of it, p. 255. But in p. 244. it is advised to omit it. LE DRAN also has many curious Observations on Trepanning. As to the Abuse of it, consult ROONHUYNS in his Observations.

C H A P. XLII.

Of Extracting Bodies fallen into the EYES.

I. IT is no uncommon Thing for the Eyes to be molested with a bit of Glass Things to be extracted from the Eyes. or Sand, a Splinter of Wood, or from off a Quill, or the Toe or Finger-Nails, and sometimes by little Insects, or caustic and pricking Bodies of various Kinds; which, by slipping into this tender Organ, we daily experience will produce excruciating Pain and Inflammation. To remove these, and prevent their bad Consequences, the Surgeon's Aid is often required: Whose chief Business is, to discharge the foreign Body as soon as possible, by some of the Means we shall hereafter prescribe.

II. The first and most easy Method of discharging these Substances, is, by Methods of Expulsion. agitating and extending the Eye-lid with one's Fingers, holding the Head down at the same time: By which means the increased Flux of Tears, excited by the vellicating Body, very often washes the same out of the Eye, without much Difficulty. But if this Method does not succeed, the next Remedy is, to blow some levigated Pearl or Crabs-claws through a Quill under the Eye-lid; that, as these are washed out by the Tears, they may also take away the foreign Body with them. Otherwise the Surgeon must take the small round Head of a slender Probe, or a little Pair of Pliers, the End of a Tooth-pick, &c. and extending the Eye-lids gently from the Eye, carefully search for, and tenderly extract the offending Body. There still remains a very easy and certain Method for removing these injurious Substances from the Eyes, by dipping a Pencil-brush of soft Feathers, or a bit of fine Sponge fastened in a Quill, in warm Water, by which you may brush them out from betwixt the Eye and its Lid. Lime, or any acrid Salt, and such like Substances, may be washed out by warm Water, or Milk, either by injecting them, or with a Feather or bit of Sponge. When the foreign Body is removed, the Surgeon must furnish his Patient with a cooling anodyne Collyrium *ex Aq. Rosar. Damasc. cum albumine ovi conquassata, & pauxillo Saccar. Saturni, vel Lap. Tutie preparat.* with which the Eye is to be frequently washed; not neglecting to bleed the Patient at the same time, if there be any considerable Inflammation.

C H A P. XLIII.

Of TUBERCLES and EXCRESCENCES on the EYE-LIDS.

Kinds.

I. **T**HE preternatural Tubercles, which we frequently meet with upon the Eye-lids, are of various Sorts and Sizes. If the Tubercle be small, hard, red, immoveable, and seated upon the Eye-lid above the *Cilia*, or Range of Hairs, it is then denominated by the *Greeks*, *Crithe*, and by the *Latins*, *Hordeoleum*, from its supposed Resemblance to a Barley-corn. This Tumor is included in a Kind of Cyst, which, by Inflammation, degenerates into a thickish Matter: From whence frequently proceed intense Pains and various other Disorders of the Sight. The Seat of the *Hordeoleum* varies, being sometimes immediately next to the Skin, and sometimes within-side the Eye-lid, under its Muscle. When the Tubercle is moveable, 'tis usually denominated *Chalazium*, or a Stithe. Some are termed *Grandines*, as being like Hail: Others are named *Hydatides*, being Vesicles replete with watery Humour. Sometimes several Species of the encysted Tumors are formed upon the Eye-lids, as the *Atheroma*, *Steatoma*, and *Meliceris*: Of which we have already treated in *Chap. XXVIII.* preceding. It may be here observed once for all, that almost all the Tubercles on the Eye-lids are of the encysted Kind, some having a small depending Basis, and others a broad one, as may be seen in *Tab. XV. Fig. 16, 17, 18.*

Prognosis.

II. We are, from the Importance and Obviousness of this Organ, obliged to undertake the Cure and Removal of many of these Tubercles: Which, in other Parts of the Body, might be very well neglected. Yet we ought not, even here, to call in the Assistance of the Knife, when they are very small, and not troublesome to the Sight; for they are often tolerable without Danger, though they may perhaps give a little Deformity. 'Tis remarkable, that these Tubercles seldom give Way to topical Remedies: Nor should you be over-forward with the Use of emollient Cataplasms, which are recommended by some; because the Eye itself may be injured by them, and therefore Extirpation is to be preferred.

Cure.

III. Almost all Tubercles of the Eye-lids, which do not hang pendulous by a small Root, are removed by making an Incision through the Integuments by the Scalpel, so as to avoid wounding the Tumor, in order to take it clean out, as we before directed for encysted Tumors in *Chap. XXVIII.* foregoing. But if the Coats of the Tumor are wounded, or adhere very firmly to the adjacent Flesh, so that it cannot well be extirpated whole by the Scalpel, it may be cut out as far as you well can by a Pair of small Scissors; and the Remainder eroded and cast off by dressing with *Ægyptiacum*, or some other digestive Ointment, mixed with *Præcipitat. rub. vel Lap. infernal.* After which you may complete the Cure with Balsams, as in other Wounds. In some Cases, when I think the Tumor cannot be totally extirpated, I make an Incision through its including Cyst, together with the common Integuments; and, after expelling or discharging its Contents, destroy the rest with Digestives and Caustics, as I directed for encysted Tumors. But here you must be very careful to prevent any of the Caustic from falling into the Eye, which might greatly injure, if not destroy.

destroy its Sight. But we are furnished with a much more ready and easy Way of removing those Tubercles of the Eye-lids, which hang pendulous by a small Root, as at *Fig. 17* and *18*. which is, either to cut them off instantly by a Pair of Scissors, or else gradually by a Ligature with a Silk Thread. But another Method must be taken with the *Hordeolum*: Because that, contrary to most encysted Tumors, is usually attended with Pain and Inflammation. Therefore in these last it will be proper, first, to try to disperse them by discutient Applications: And if that will not succeed, to bring them to Suppuration before they are incised. It will greatly conduce to disperse and ease the Pain of an incipient *Hordeolum*, if the Patient frequently foment it with his fasting Saliva, or else with a Mucilage *ex Sem. Cydonior.* or the Pulp of a roasted Apple mixed with a little Saffron and Camphire. If none of these succeed, but the Tumor holds on its Inflammation, and begins to turn yellow, you may ripen and break it with a *Diachylon* Plaster, or a Mixture of Honey and Meal. But the Cure of it will be sooner completed, if you invert the Eye-lid, by Incision with a Scalpel a-crofs the Tumor, so as to separate the Skin of the Eye-lid, and extract the Cyst entire, if it be hard; otherwise you may open the Cyst, and discharge its included Matter, and destroy the Remainder by Digestives: By which means you will avoid an unsightly Scar in the Eye-lid, and the Wound itself will heal without the Application of other Medicines.

C H A P. XLIV.

Of WARTS on the EYE-LIDS.

I. **T**HE Eye-lids are frequently molested as well with Warts as the forementioned Tumors, which often both obstruct the Sight, and disfigure the Eye: For which Reasons the Patient is desirous of their Removal. These Warts adhere to the Eye-lids, either by a broad or slender Basis; and may be extirpated either by the Knife, Ligature, or Caustics, in the Manner we directed for Warts in general, in *Chap. XXVI.* preceding. You must never apply the actual Caustery to destroy these Warts, as you may for those in other Parts of the Body: Nor should you apply Caustics but with the greatest Circumspection; lest, if any Part should slip into the Eye, it might greatly injure, or destroy the Patient's Sight^a. If a Wart on the Eye-lid appears blackish, or livid, you will generally have Reason to fear its turning cancerous, as it will do, especially if irritated with Instruments or Medicines. For this Reason, these are usually termed, *Noli me tangere*, by the most expert Oculists: So that it is best to leave this Species of Warts to themselves. I happily removed a large Wart from the upper Eye-lid by Ligature, which had no broad Root, but impeded the opening of the Eye-lids: The Figure of which Wart you may see in *Tab. XV. Fig. 17. A.*

^a Thus TIMÆUS à GULDENKLE, *Lib. I. de Affect. Capit. Cap. XXI.* relates the Case of a Surgeon, who blinded a Woman by endeavouring to remove a Wart from her Eye-lid by the caustic Juice of Spurge.

C H A P. XLV.

Of Relaxation and Tumor of the EYE-LIDS, termed Phalangosis and Ptofis.

Nature of
the Disorder.

I. **W**E frequently meet with the Eye-lids either tumified, or relaxed to such a Degree, as greatly deforms the Eye, and impedes its Vision. Sometimes the relaxed Eye-lid subsides in the Manner represented by *Fig. 19. Tab. XV.* occasioned either from a Palsy of the Muscles, which sustain and elevate the Eye-lids, or from a Relaxation of the *Cutis* above, from various Causes. Sometimes an œdematous or aqueous Tumor is formed on the Eye-lids, so as almost entirely to exclude Vision: Which last Case should be well distinguished from the former, and may be remedied, without much Difficulty, by the Use of internal and topical Medicines. Such are Purges with Diuretics and Sudorifics inwardly; and a Compress dipped in warm *Sp. Vin. Campb. & Aq. Calc.* externally. But, in the paralytic or relaxed Case, you must use nervous and cardiac Medicines, and apply a little *Bals. Peruv. cum Aq. Reg. Hungar. &c.* If these Medicines should all miscarry, the best and most expeditious Method is, to extirpate a sufficient Quantity of the relaxed *Cutis*; and, after healing up the Wound, the Remainder may become sufficiently shortened.

The antient
Method of
Cure.

II. The Antients contracted the Skin thus relaxed, by extirpating Part of it with the Assistance of a Ligature with a Needle and Thread. Having first carefully secured it by Ligature, by passing the Needle through the Bottom of the Skin, they then cut it off close to the Ligature: Which, in many Cases succeeded very well. Sometimes they first amputated Part of the relaxed Skin by the Scissors or Scalpel, and then secured the Wound, either by Ligature or Suture, with a Needle and Thread, as we read in HIPPOCRATES, (*Lib. de Vict. acut. Sect. 66.*) CELSUS *Lib. VII. Cap. 7. N. 8.*) and PAULUS ÆGINETA *Lib. VI. Cap. 8.* But the Hæmorrhage frequently proves so large in this last Method, as to obscure the Wound, and render it impossible to make a neat Suture, or Ligature: To avoid which Inconvenience, the famous German Oculist, BARTISCHIUS, formerly contrived a wooden Instrument, *Tab. XV. Fig. 19. BB.* to intercept the redundant Part of the *Cutis*, and, compressing it by turning the Screw *DD*, so as to obstruct the Blood-vessels, and hinder the Circulation, the intercepted Part mortified in a few Day's time, and cast itself off.

The modern
Treatment.

III. But as the last mentioned Practice of BARTISCHIUS was attended with great Pain, Inflammation, and other Inconveniences; VERDUYN has much improved upon him, by making almost a similar Instrument of Brass, but with Perforations in its upper and lower Plates, as in *Tab. XV. Fig. 21.* By which Instrument the redundant *Cutis* is not only compressed, but also secured with a Ligature, by passing a Needle and Thread through the Apertures, and leaving about four or five Inches of the Thread hanging down on each Side; you then amputate the redundant Skin, close to the Edge of the Instrument, with a Scalpel, or Pair of Scissors: After which you remove the Instrument, and make a Ligature with the Threads. Having performed your Operation, the Wound is, for the first Time, to be dressed with some vulnerary Balsam and scraped Lint: But, in the subsequent Dressings, you may spread your Lint with some digestive

digestive Ointment, to be retained with Compress and Bandage, as we directed in other Wounds of this Part. After a few Days, when the Lips of the Wound appear to be pretty well closed or conjoined, you may then cut the Ligature, and carefully extract the Threads, removing them, not all at once, but one at a Time, in each Dressing, and compleating the Cure with some vulnerary Balsam and Plaster. You may cauterize the Wound before the Removal of the Instrument, which will not only suppress the Hæmorrhage, and render the Disorder less liable to return again, but may perhaps, at the same time, save you the Trouble of making a Ligature or Suture. Sometimes this Disorder is so great, as to destroy the Figure of the Eye, or so obstinate and inveterate as to return again, after a repeated Performance of the Operation; which renders the Case incurable. Lastly, we may observe, that RAW invented an Instrument, not much differing from the former in its Make and Uses; (see Fig. 22.) but you may see the original Invention of this Instrument highly controverted between him and RUYSEN*, who rather attributes it to ADRIANSONIUS.

C H A P. XLVI.

Of the Trichiasis, or Inversion of the EYE-LIDS; in which the Hairs irritate the Eyes.

I. **T**HE *Cilia*, or Margins of the Eye-lids are sometimes inverted, so as Cause of the Disorder. greatly to irritate the sensible Coats of the Eye, and bring on intense Pains and Inflammation; which, without timely Assistance, may greatly injure, if not totally destroy the Sight. This Disorder is, by the *Greeks*, termed *Trichiasis*, or *Distichiasis*, hairy; and sometimes *Entropion*, *Inversion*, because herein the Lids and their *Cilia*, or Hairs, are inverted, so as to offend the Eye. The Disorder is generally occasioned from an irregular Cicatrix formed from a Burn, the Small-Pox, an Ulceration, or Wound from some external Injury. Sometimes a Relaxation of the Skin, and a paralytic Disorder of the Eye-lids, described in the preceding Chapter, make one of the chief Causes of a *Trichiasis*. Nor is the Cure of a *Trichiasis* to be effected without much Difficulty, especially when the Disorder is become inveterate.

II. 'Tis hardly possible for the Surgeon to remove this Disorder, so as to prevent its returning, without extirpating the offending Hairs: Which every one Method of Cure. must allow to be no easy Operation, that has seen any thing of the Disorder. For if you cut the Hairs close off, it will be to no Purpose, because the rigid and sharp-pointed Stumps of the Hairs will shoot up and irritate the Eye worse than the Hairs did before. Some indeed endeavour to cure the Disorder, without extirpating the Hairs, by clearing them out from the Eye, and keeping them folded back, or pasted on the Outside of the upper and lower Eye-lids by some sticking Plaster. But this Practice is not often attended with the desired Effect; because the Motion of the Eye-lids loosen the Hairs, and they become again inverted, so as to offend the Eyes, as before. In this Case therefore the Practice of some is conformable to the Advice of CELSUS (*Lib. VII. Cap. 7. N. 8.*) who directs to burn out the Roots of the Hairs, one by one, with a

* See RUYSEN *Epist. Anat. XIII.* and RAVIUS in *Tract. de Septo Scroti.*

slender,

slender, but broad-pointed Needle of Steel, in the Shape of a *Spatula*, heated red-hot. But *ÆGINETA* (*Lib. VI. Cap. 13.*) directs to extract each Hair first with a Pair of Pliers, before the Cauterization of their Roots; which is an Operation so painful, that the Patient will hardly submit to it. Therefore some chuse to fill up the Cavities at the Roots of the Hairs, after their Extraction with *Lap. infernal.* or some other Caustic, taking great Care that no Part of it slips into the Eye. Or it will be better to touch their Cavities with a small Pencil-brush dipt in *Sp. Salis Ammoniaci cum Sp. Vini rectificatiss.* by which means they will cicatrize and close up, without producing any more Hairs. When there are many injurious Hairs to be thus extracted, it will be better to remove them at several Times, than all at once: Otherwise you may induce too great Pain and Inflammation on the Eye, whose *Cornea* should be also defended from the Caustic or Caution here used by a smooth hollow Plate of Lead, Wax, or Horn, adapted in the same Manner as for artificial Eyes. If the Disorder should arise from a Relaxation of the Eye-lids, it will be necessary to treat it in the same Manner we directed in the preceding Chapter.

Other Methods.

III. But if all the Hairs of the Eye-lids are thus inverted, and the Patient will not permit them to be extracted by the Roots, and to be afterwards treated with Caustics; there then remains but one, and a lamentable Method of removing the Disorder, by amputating the *Cilia*, or cartilaginous Margins of the Eye-lids themselves: Which the Patient had better submit to, notwithstanding the Deformity it may occasion, rather than be blind. After the Operation, a *Collyrium* should be made, and applied *ex Aq. Rosar. alb. Ovor. & pauc. Sacchari Saturni, vel Aquâ & Sp. Vini ana*; and the Wound must be treated in the subsequent Dressings with some Balsam till it be healed. But lately *CORTUMIUS*, in a professed Dissertation *de Trichiassi*, under Professor *GOELICKE*, 1724, has proposed a new Method of removing the *Cilia*, rather by Caustics with *Lap. infernal.* than by Amputation. When the Patient is laid on his Back, he directs first to arm and defend the Eye with Lint or Leather; and then to rub the *Cilia* with strong *Lapis infernalis*, till the cartilaginous Margins of the Eye-lids with their Hairs, are eroded and removed: After which you are to dress first with dry Lint, and then with a *Collyrium ex Aq. Rosar. & Alb. Ovor.* to be often renewed. The next Day you must remove the Lint, or leathern Defensive from the Eye, to avoid an Inflammation from it: And, if any small Eschar should be formed underneath the same, it may be removed by some digestive Ointment. By which means, if you clear the Eye well from the Lint, he asserts that the Wound will be cured generally within the Space of six or eight Days.

C H A P. XLVII.

Of the Ancyloblepharon, or CONCRETION of the EYE-LIDS.

Description. I. **T**HE Disease termed *Ancyloblepharon*, is when the Eye-lids cohere, or grow to each other, or to the Eye itself. It is easily distinguishable from the glewing up of the Eye-lids in the Small-Pox and Inflammations, by an Inspissation of the Juices and glutinous Matter, by which they are strongly fastened

fastened together for some Time, but without intimately concreting, because they separate again spontaneously in a little Time afterwards.

II. Sometimes the Eye-lids cohere, so that they cannot be opened, to admit the *Causes*, Light for Vision, either in one or both of the Eyes, as in *Tab. XV. Fig. 23. AA.* Sometimes again the Eye-lids grow to the Globe of the Eye itself, either to its *Tunica cornea*, *Albuginea*, or both. Which Accidents generally arise from violent *Ophthalmias*, Burns with Gunpowder, or other Fire, the Small-Pox, caustic Remedies, or an Ulceration of the Parts from many other Causes. 'Tis true, this Disorder is sometimes born with the Infant; and may sometimes arise in Adults from a fleshy Excrecence in the Angles of the Eyes growing to the Eye-lids, as I had once an Instance myself. See *Miscell. Nat. Cur. Dec. II. Ann. 8. pag.*

135.

III. The Cure of all the several Species of this Disorder is, in some Measure, *Prognostic* both doubtful and dangerous, but of none more than that in which the Eye-lids are conjoined to the *Cornea*: For in that Case it will hardly be possible to free them without blinding, or at least injuring the Patient's Sight. Nor is there less Difficulty to free the Eye-lids from each other, when they cohere from a Burn. Therefore in all Burns and Ulcerations of the Eye-lids, great Care should be taken to treat them with emollient and cooling Topics, and to keep them free from Adhesions, to which all inflamed and excoriated Parts are extremely subject. When the Eye-lids grow together in the Small-Pox, they generally adhere at the same time to the *Cornea*, from whence they cannot easily be separated without injuring the Sight. For, after the adhering Parts have been freed from each other with the greatest Judgment and Caution, there are almost constantly some little Scars or Specks left upon the *Cornea*, which greatly impede the Sight for the future, and which it will be almost impossible to remove.

IV. From what has been said concerning the Nature of the Disorder, you will *Cure* readily conclude, that the Cure must consist in a skilful Separation of the conjoined Parts. In order to which, the Patient is first to be placed on a Bed or Chair against the Light, in the most convenient Position for the Operator; who is first to examine whether the Eye-lids are totally conjoined, or whether there may not be some small Interstice left, which you will generally meet with in the greater or internal *Canthus* of the Eye next the Nose. If the Eye-lids are strictly conjoined in every Part, you may then begin to make your Division in either of the *Canthi*, or Angles, which appears to be most convenient; but with a soft Hand, and great Circumspection, to avoid wounding the *Cornea*, or Eye itself. When you have made a small Aperture, a Pair of Scissors, or Scalpel, with a blunt Point, are to be introduced, with which (*Tab. XV. Fig. 25.*) you gradually and carefully divide the Lids from each other. But if there is naturally left a small Aperture betwixt the Eye-lids, where they do not adhere, you may then immediately introduce one of the forementioned obtuse-pointed Instruments, and proceed to make your Incision: Or, if you have none that are obtuse-pointed, introduce a small grooved Director, *Tab. XV. Fig. 24.* and then you may safely divide with the common Sort of Scissors, Scalpel, or a Lancet.

V. When the Eye-lids have been carefully separated from each other, you must then examine with a Probe, whether they adhere to the Eye itself: If they do, you must again free them cautiously with an obtuse-pointed Scalpel or Lan-

cet. But when the whole Globe, or the greater Part of the Eye is firmly attached to the Lids, the Operation is both difficult and dangerous; as it will be almost impossible to free the *Cornea* without injuring the Sight: Which Accident may be avoided, and the Cure more easily obtained, when the Lids adhere only to the *Albuginea tunica* of the Eye. Even Wounds of the last mentioned Tunic are of so little Consequence, that I would always chuse rather to cut off Part of that in dividing them, than to leave Part of the internal Membrane of the Eye-lid adhering to it: For the internal Membrane of the Eye-lids cannot be amputated without inducing great Injuries on the lacrymal Gland and Duct. Therefore it is highly necessary for this Operation, to be performed by an expert and steddy Hand.

Treatment
after the
Operation.

VI. When the Lids have been freed from the Globe of the Eye, the next Business is, to prevent them from joining again; which they will certainly do, if not prevented by interposing some Lint, or a thin Plate of Lead, Wax, Leather, or a bit of Gold-beater's Skin, cut in the Shape of a Half Moon, and moistened with *Ol. Amygd. dulc.* Either of these are to be left several Days in the Eye, till there is no Danger of future Adhesions: And if they should fall, or be taken out, they must be again replaced in a short Time. If the Patient cannot bear the Interposition of the forementioned Plates, as is sometimes the Case, he must then frequently agitate and work round his Eye-lid, at Intervals, after having used a Collyrium *ex Aq. Plantag. Lap. tulie pp. & Sacc. Saturni*, or a Powder prepared *ex Saccuaro, Margaritis & Lap. Cancror.* And, lastly, the Surgeon himself must sometimes pass the obtuse End of a Probe betwixt the Lids and the Globe of the Eye, to free and keep them from Adhesions.

Adhesions in
the Small-
Pox.

VII. When the Eye-lids are glued together by a gummosc and inspissated Matter in the Small-Pox, and Inflammations of that Organ, so that they cannot easily be opened; they should never be forcibly pulled asunder, but be first moistened a considerable Time with warm Milk, and other emollient Topicals: By which Means the Patient will generally be able to open the Eye himself soon after.

C H A P. XLVIII.

Of the EVERSION and GAPING of the EYE-LIDS, termed Ectropium and Lagophthalmia.

Origin of
the Disorder.

I. **W**HEN the Eye-lids are everted or retracted, so as to shew their internal or red Surface, and cannot sufficiently cover the Eye, the Disorder is then denominated *Ectropium* and *Eversio Palpebrarum*, by the *Greeks* and *Latins*. When the upper Eye-lid only is thus disordered, it is then denominated *Lagophthalmus*, *Oculus leporinus*, or Hare-eyed. Some indeed will have the *Lagophthalmia* a Retraction of the upper Eye-lid without any Eversion, so that it cannot cover the Eye: Which Accident does also happen to the lower Eye-lid, as I have often observed, without any Eversion, though it is not mentioned by others as a Species of the *Ectropium*. Sometimes this is a simple, or original Disorder; and sometimes only a Symptom or Consequence of another, as an Inflammation, Sarcoma, Tumor, &c. When the Disorder is simple, or original, it generally arises from a Contraction of the Skin of the Eye-lid by the

Scar of a Wound, Ulcer, Burn, &c. or from an Induration and Contraction of the Skin, after an Inflammation; and sometimes it may proceed in a great Measure, from the Use of astringent *Collyria*, injudiciously applied in Disorders of the Eyes.

II. The Cure of this Disorder consists in relaxing and elongating the external Skin of the Eye-lid, so as to cover the Eye: Which is often no easy Task to perform, especially when the Disorder is become inveterate. When the Disorder is recent, it will be best to try the Application of Emollients; such as the Vapours of hot Milk or Water, Oil of Almonds, or Olives, Mucilage of Quince-Seeds, Hare's Fat, *Ung. Dialthææ*, &c. to be continued for several Days on the Scar or contracted Skin of the Eye-lid; which must be often extended either upwards or downwards, according as the Disorder is either in the upper or lower Lid. When the Patient goes to Bed, it will be proper to bring the Eye-lids close to each other, and to restrain them so by Plaster, Compress, and Bandage, to be repeated or renewed every Night. But if none of these Means take effect, you must then have Recourse to the Operation, when you judge the Case curable. Which is performed in the following Manner:

III. First, you make a semilunar Incision in the external Skin of the Eye-lid, next its Tarsus, or cartilaginous Margin, making the Angles of the Incision downward in the upper Lid, and upward in the lower Lid (as in *Tab. XV. Fig. 26. AA.*) that, by this Means, the Skin may be elongated. If the Skin does not appear to be let out enough by one Incision, you must make two or three more, running parallel with the first, and about the Distance of a small Pack-thread from each other. When the Eye-lid is thus sufficiently elongated, you must dress the Wound first with dry Lint stuffed into the Incisions; and then with Lint, moistened with some vulnerary Unguent, which will both prevent the old Skin from uniting again, and at the same time cause new Flesh to sprout up in the Incisions, to elongate the Skin. Lastly, to forward the Extension and Cure, a Piece of sticking Plaster should be fastened to the Margin of the Eye-lid, to keep it extended either up or down: Which Method is to be continued till the Eye-lids will shut close.

IV. When the Disorder arises from an Inflammation, or fleshy Excrescence within-side the Lid; you must, in that Case, first, remove the Inflammation by the Remedies we have elsewhere described for that Purpose: And then, after arming the Eye with a defensive Plate, remove the Excrescence by *Lapis infernalis*^a. And thus, by removing the Impediments, the Eye will recover its former Action. When the Disorder proceeds from an *Encantibis*, *Hyperpharicosis*, or *Sarcoma*, as in *Fig. 27, 28, 29. Tab. XV.* you may remove it by the Directions we shall presently give in the two following Chapters.

V. When the Skin of the Eye-lid has continued violently distorted or contracted from the Patient's Birth, there is seldom any Hope of curing it. And it is still more impossible to obtain a Cure, when the lower Eye-lid is everted through a Weakness of the orbicular Muscle in old People, without any Appearance of a Scar: In which Case the Operation will be to no Purpose. If any good can be done, it will be most likely by corroborating and spiritous Medi-

^a See IVESIIUS on this Subject, *Lib. de Morb. Ocul.* See likewise ROONHUY'S, *Obs.* 18. & BIPLOO *Exercit.* p. 153.

cines both external and internal. But in general, this Disorder is always the more obstinate and difficult to cure, as it is more inveterate, or of longer Standing. We have a learned Dissertation *de Entropio* by KECKIUS, *sub Præsidio ZELLERI, Tubing. An. 1733.*

C H A P. XLIX.

Of the ENCANTHIS.

I. **W**E sometimes meet with a Tubercle, formed in the greater or internal *Canthus* of the Eye, growing out either from the *Caruncula lachrymalis*, or from the adjacent red Skin: Which Tumor is sometimes large enough not only to obstruct the *Puncta lachrymalia*, but also Part of the Sight, or *Papilla* of the Eye itself^a. In this Disorder the Tears continually run down the Cheek, which greatly deforms the Eye and Face, and gives Rise to an *Ophthalmia*. See *Tab. XV. Fig. 27. A.* This Tubercle, denominated *Encanthis* by the Greeks, is of two Kinds: The mildest of which is that without Hardness and Pain: But the most obstinate and malignant Species is livid, and very painful, tending, in some Measure, to a cancerous Nature.

Treatment
of the first
Species.

II. In the Beginning of the mild Species of the *Encanthis*, it will be highly useful to scarify first, and then to apply some mild escharotic or caustic Medicine: Of which the most innocent is a Powder of *Saccar. Canariens.* & *Vitriol. alb. aut Alum. ust.* in the Proportion of five Parts of the first to one of either of the last. A little of this Powder being carefully sprinkled upon the Tumor, is afterwards to be washed out of the Eye with warm Water. If this proves insufficient, you may sometimes touch the Tubercle with *Lapis infernalis*, but with great Caution. But to turn off the Humours from the Eyes, and prevent a Relapse of the Disorder, you must have Recourse to Issues or Setons, with Phlebotomy, and cooling Purges. If you find, that the Application of the Medicines takes no Effect, or if the Tubercle is of the malignant Species, you then draw it out either with a Hook, *Tab. XV. Fig. 30, 31.* or a Pair of Pliers, or else, when it is very large, with a Needle and Thread passed through it, and tied together like a Sling for a Handle; by which you must gradually and carefully extend and draw up the Tubercle, in order to avoid wounding the Eye itself, or the lachrymal Caruncle, which would be attended with very bad Consequences. For as the lachrymal Caruncle in the greater *Canthus* of the Eye, stops and prevents the Tears from overflowing, and running down upon the Cheek, if you was to cut off Part from it, the Consequence would be a watery Eye, or constant Flux of Tears over the Cheek. It is therefore rather better to leave Part of the morbid Tubercle, than cut off any Part of the lachrymal Caruncle: Because any Remains of the first may be afterwards cleared away, by Degrees, with Escharotics, if you cannot take it off with a Pair of Scissors. After an Extirpation of the Tubercle, you must apply deterging and healing Medicines, or a Collyrium *ex Lap. Tutie, Myrrhæ, &c.* till the Wound is healed.

Treatment
of a malignant
Encanthis.

III. In a malignant *Encanthis*, inclining to be cancerous, being hard, livid, and very painful, 'tis generally better to let it alone, and to mitigate its Uneasiness with cooling and lenient Collyria, than to exasperate it by the Opera-

^a See a Figure of a large *Encanthis* in PURMANNUS's *Chirurgia Curiosa*, pag. 134.

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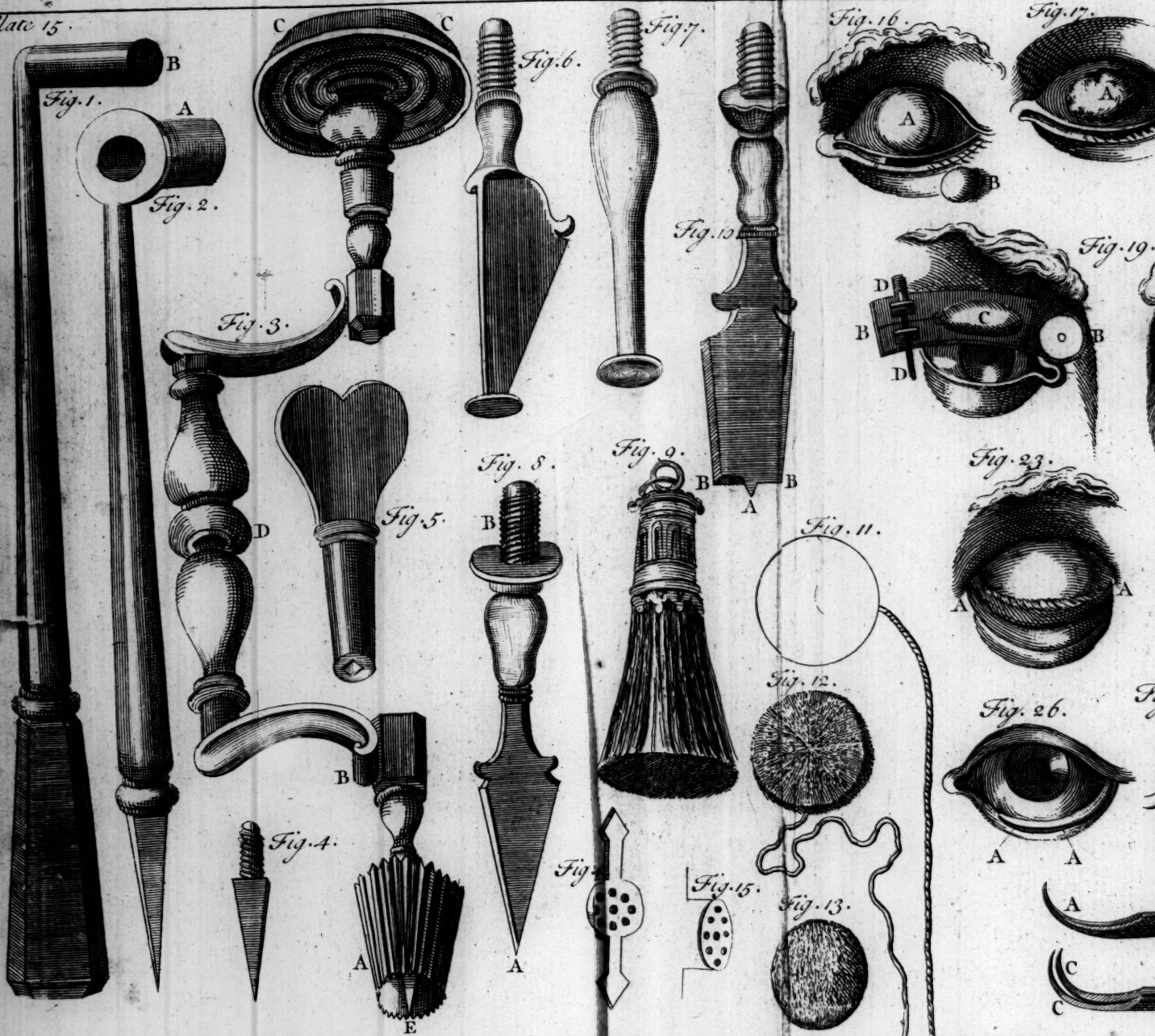
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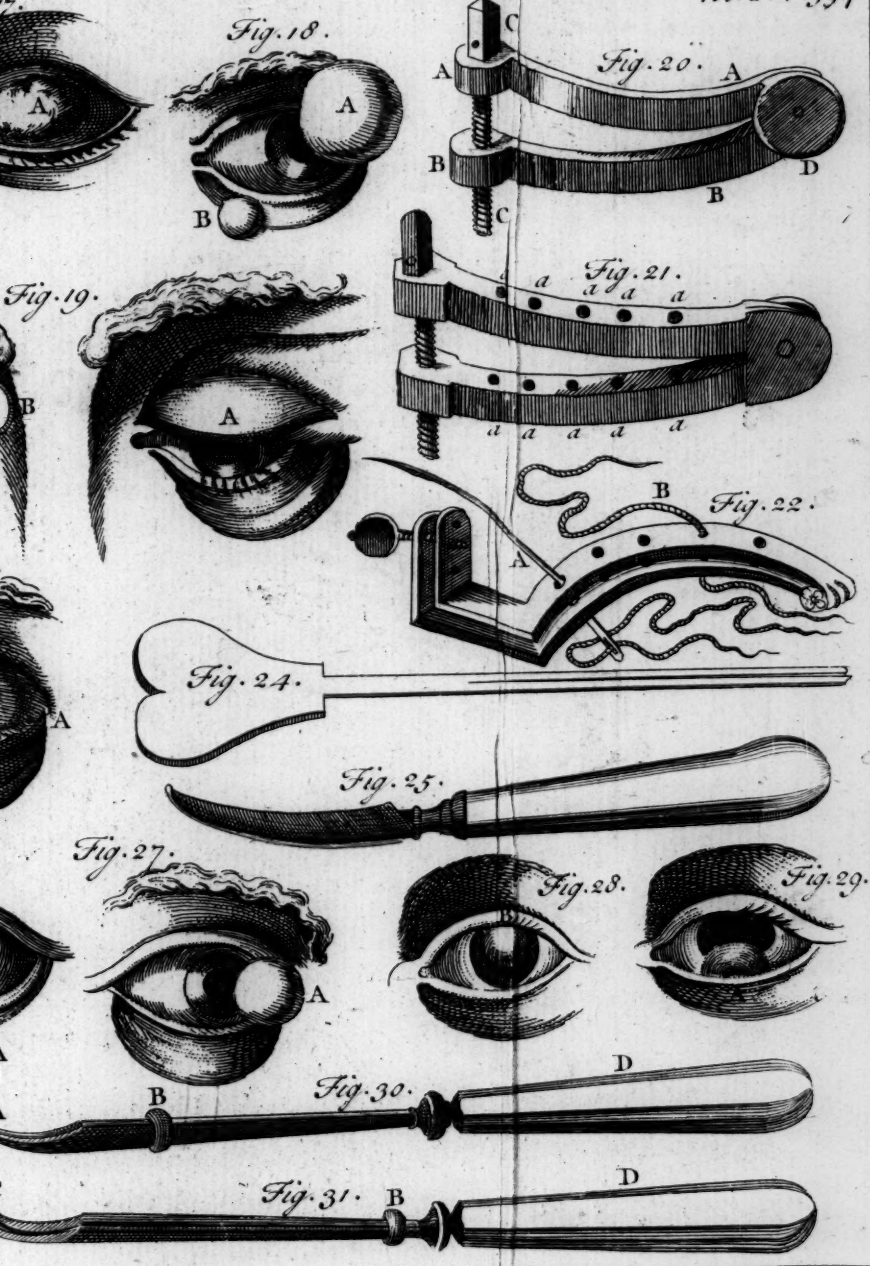
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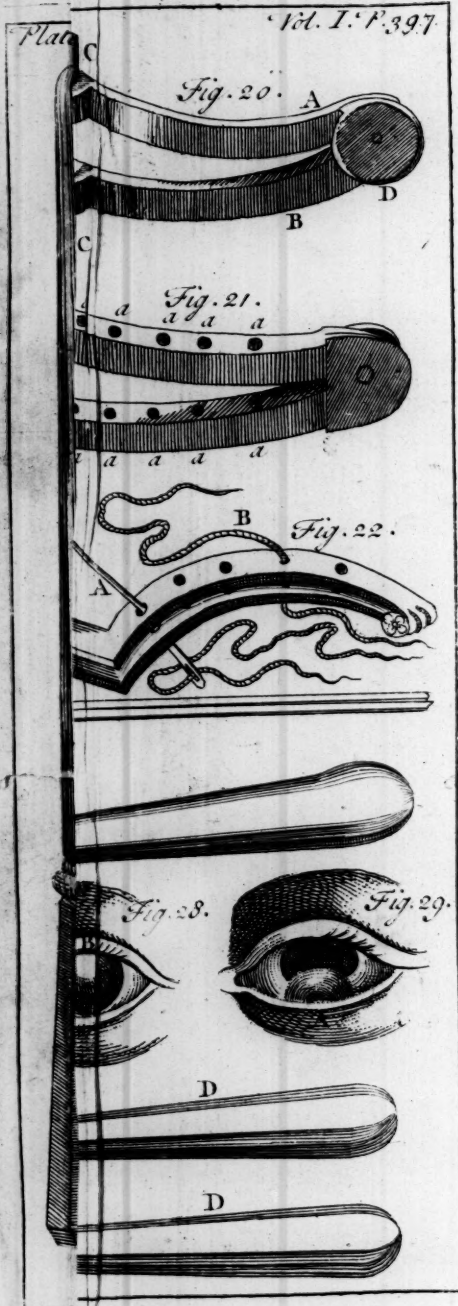
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Fig. 7.







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tion, or by escharotic Medicines: Otherwise you may perhaps bring on Symptoms worse than the original Disease, as is frequently done in cancerous Disorders by improper Treatment. We have an extraordinary Cure of this Disorder related by PURMANNUS in his *Chirurgia Curiosa*: In which, after having extirpated the very large Tubercle by Ligature, he applied an actual Cautery to its Root with Success.

C H A P. L.

Of the Sarcoma and Hyperfarcosis, or Excrecence formed betwixt the EYE and its LIDS.

I. **R**ELATED to the foregoing Disorder are those Tubercles, or fleshy Ex-^{Description.} crecences, on the inner Surface of the Eye-lids, termed by the Greeks, *Sarcomata* and *Hyperfarcosis*: (See *Tab. XV. Fig. 28, 29.*) which, in the Beginning, are usually very small; but by Degrees advance to a considerable Bulk. Some of them are smooth and even surfaced; and some again are rough and unequal like the Raspberry or Mulberry: Of which Excrecences I have seen and cured several.

II. I generally remove these Tubercles, first, by carefully extracting them ^{Cure.} with a small Hook, *Tab. XV. Fig. 30, 31.* and then cutting down to the Root with a Pair of small Scissors. After letting it bleed a while, I order the Patient frequently to wash his Eye with a Collyrium *ex Lap. Tutia, Aloeæ & Sacc. Saturn. in Aq. Ros. Solut.* till the Wound is healed. Instead of a Hook you may also extend the Tubercle, by passing a Needle and Thread through it. Some endeavour to remove these Tubercles by Escharotics, and *Lap. infernalis*: But I think Incision to be much safer, as well as more expeditious, and less painful.

An EXPLANATION of the FIFTEENTH PLATE.

Fig. 1. Is an Iron Cautery to make Issues in the Head: A the Handle, B the Cautery.

Fig. 2. A denotes the Cannula to receive and direct the Cautery, *Fig. 1.*

Fig. 3. The *Trepan* which I use. A denotes its *Crown*, B the Place where the Crown is screwed on. CC the upper Part of the Handle, upon which the Hand is laid in the Operation. D the Arch of the Handle by which the Instrument is moved round; E a Spike in the Crown. The Moderns have a Method of fastening the Crown on the *Trepan*, otherwise than by screwing: but this is my Way.

Fig. 4. Represents the Spike taken out of the Crown.

Fig. 5. Is the Key or Winch, by which the Spike is taken hold of and screwed into the Crown.

Fig. 6. A lenticular Scalpel, with which the rough Edge of the Bone is smoothed after the Use of the *Trepan*.

Fig. 7. Is a Steel Instrument, commonly called a *Depressor*, with a flat Button at its End, to press down the *Dura Mater*, and discharge the latent Blood. The same Instrument is also by some termed *Meningophylax*.

Fig. 8. Is a kind of *Terebra* to be fastened to the Handle at B, Fig. 3. after having taken off the Crown, being used to make the first Entrance for the Spike of the Trepan, and to perforate Bones in the *Spina Ventosa*; whence it is also sometimes named the *perforating Trepan*; A denotes its Point, B the Screw to fasten to the Handle.

Fig. 9. Is a Hair-brush to cleanse the Teeth in the Crown of the Trepan.

Fig. 10. Is the exfoliating Trepan, which is sometimes used to pare away a carious Part in a Bone. A its Point; B B the Wings which scrape the Bone, when the Instrument is turned round.

Fig. 11. A Dossil of Lint, furnished with a Thread, for dressing the trepanned Cranium.

Fig. 12. A Pledgit, or round Compress of scraped Lint secured with a Thread.

Fig. 13. Is another Pledgit of Lint without a Thread, to fill the Aperture of the Cranium.

Fig. 14. Is the Leaden Plate of BELLOSTE, to defend the Aperture and Dressings.

Fig. 15. Denotes the Shape in which the said Plate is to be first bent.

Fig. 16. A denotes an encysted Tumor, or *Atheroma*, in the upper Eye-lid; and B is another in the lower Eye-lid.

Fig. 17. A large flat Wart on the upper Eye-lid, having a slender Root, so as to fit it for Removal by Ligature with a Piece of Silk.

Fig. 18. Is a *Sarcoma* or Excrecence on the Outside of the Eye-lid, with a small Root.

Fig. 19. Represents the *Phalangosis* and *Ptofis*, or Tumor, and Relaxation of the Eye-lids. A denotes the Disorder in the Left Eye: B B an Instrument contrived by BARTISCHIUS, adapted to remove this Disorder in the Right Eye: D D a Screw by which the two Arms of the Instrument are approximated, or brought together.

Fig. 20. Is an Instrument like the first, but improved by VERDUYN, and as it is figured by RUYSCH, in *Epist. Anat. XIII.* A A and B B denote the two Arms of the Instruments without any Perforations, to remove various Tubercles by approximating them by the Screw C C, and moving the Hinge D, by which they are connected.

Fig. 21. Denotes the same Instrument of VERDUYN, only a little larger, and perforated with many small Holes a a a a, to make a Suture for this Disorder of the Eyes.

Fig. 22. Is an Instrument for the same Use corrected by RAW, and taken from his *Epist. de Septo Scroti*, being made more crooked, and shutting differently. A the Manner of passing the Needle through its Apertures: B the Thread drawn through to conjoin the Wound of the Eye-lid.

Fig. 23. Exhibits an Eye with the *Ancyloblepharon*, or Concretion of the Eye-lids, marked A A.

Fig. 24. Is a small grooved Director, sometimes useful to divide Concretions of the Eye-lids.

Fig. 25.

Fig. 25. A small Scalpel with an obtuse Point, used in several Disorders of the Eyes.

Fig. 26. Represents the Manner of incising the lower Eye-lid in the *Ectropium*, or *Lagophthalmia*, or Eversion and Retraction of the Eye-lids.

Fig. 27. Represents an *Encanthis*, or Excrescence in the Corner of the Eye near the Nose.

Fig. 28 and 29. Denote a *Sarcoma* and *Hyperfarcosis*, or fleshy Excrescence within the Eye-lid; that marked A belonging to the lower Eye-lid, and that at B to the upper Lid.

Fig. 30. Represents a small Hook, for elevating and extending those Tubercles, to extirpate them: The crooked Point of which may be made either single or double, as you may see by removing the Gripe B in Fig. 31. where C C denote the two Prongs, D D the Handle.

CHAP. LI.

Of BLEEDING in the EYES.

I. **T**HOUGH Blood-letting in the Eyes has been, a few Years ago, advanced by the *English* Oculist Mr. WOOLHOUSE, as an Invention of his own; yet it manifestly appears, from various Treatises, that the Operation was both known, described, and practised above an hundred Years before among the *German* Physicians^a. This Operation is cried up by Mr. WOOLHOUSE, as of greater Consequence than any other Discovery in Physic: He even thinks it preferable to the celebrated Philosopher's Stone^b.

Not a new Discovery.

II. Blood-letting may be successfully used in the Eyes: 1. Whenever those Organs are inflamed; that is, when the Blood-vessels, spent on the White of the Eye, appear much larger and more numerous than usual: Wherein it will often succeed, when other Medicines, and even Phlebotomy, have been tried without their due Effects, and when the Inflammation runs to such a Height as to endanger the Sight. 2. It may be used to Advantage when the *Cornea* is infested with Specks or Abscesses: For, after dividing the Vessels which supply the Disorder, it may be much more easily removed. 3. It may be used when a red Coat or Film grows upon the Eye: For the oftener the Vessels are incised, which nourish the Film, the sooner it will shrink, and disappear. Lastly, 4. it may be used by way of Prevention, when the foresaid Disorders have been removed, and threaten a Return, by the Intumescence of the Vessels in the White of the Eye: In which Case you therefore ought to incise the turgid Veins, and foment them.

In what Cases useful.

^a See MAUCHART, in *Dissert. de Ophthalmocyti*, pag. 18. FELIX PLATERUS *Prax. Med.* 8. Lib. i. *Tit. de Visus Laes.* 1609. pag. 280. & 4to *Basil.* 1656. pag. 238. He is again cited on this Head by M. A. SEVERINUS, in *Medicina Efficaci*, Anno 1682. edit. pag. 50. Cap. x. which treats of letting Blood in the Eyes.

^b See the *Dissertations savantes & critiques de M. WOOLHOUSE*, pag. 310. and *Dissert. Ophthalm.* pag. 224.

III. There

Method of
Operating.

III. There are several Ways of performing this Operation, of which we shall here only relate the chief. First, the Patient is to be seated conveniently on the Bed-side, or on a Chair, with his Head held in a proper Posture by an Assistant: Which done, the Surgeon makes a transverse Incision with a Lancet upon the turgid small Veins in the Corners of the Eye, so as to open them, or cut them quite asunder. Some use a small Pair of Scissors, instead of a Lancet, to divide the Vessels: But, in using either of them, the Eye-lids must be held apart from each other by the Fingers of one Hand, while the Vessels are incised by those of the other. Some, again, elevate the small turgid Veins with a crooked Needle before they divide them, the Eye-lids being, in the mean time, held asunder by an Assistant*. But it would be still better to have these crooked Needles made thin and double-edged, so that they may divide the Vessels, of themselves, in the Elevation, without the Use of Lancet or Scissors. Lastly, there is no material Objection, why this Operation may not be almost as advantageously performed by the scarifying Instrument we shall describe in the following Chapter.

What is to
be done after
the Opera-
tion.

IV. The small Veins being thus incised or divided, their Discharge of Blood should be promoted by Fomentations of warm Water, or a Decoction *ex Euphrasia Hyssop. Veronica, &c.* frequently applied to the Eye by means of a Sponge, or soft Linen Rags. For this Operation will be more serviceable, as the Discharge procured is more copious. But if once performing it does not suffice to remove the Swelling and Inflammation, it may be, safely repeated two or three Times more; assisting it in the mean time with the Use of a proper Regimen, Diet, and Medicines both external and internal. I must indeed confess, that after having performed this Operation myself, on several Patients, first at *Altorf*, and since at *Helmstadt* in *Germany*, I could not possibly prevail on them to have it repeated, and it was with the greatest Difficulty that they were persuaded to it at all; some being deterred from it by fear of losing their Eye-sight, and others upon the Account of the great Pain which it must necessarily inflict on this tender Organ. The Reason of its being seldom performed on Infants, is the Difficulty of persuading them to hold their Head and Eyes steady: And the Danger of applying a Lancet, or other sharp Instrument, when those Parts are in Agitation, is very apparent to every one.

Another
Method.

V. To this Operation is related that by Incision, proposed in a Dissertation under CAMERARIUS at *Tubingen*, *Ann.* 1734. for a venereal Ophthalmia: In the most violent Symptoms of which Disorder it is advised to make a circular Incision in the White of the Eye round the *Cornea*, to discharge the stagnant Blood, or other Matter distending that Membrane, and obstructing its Vessels. But whether this is a safe and useful Practice, or whether it may not be used with Success in other violent Ophthalmias, as well as the Venereal, can be only ascertained by the best of Teachers, Time, and Experience.

* This is the Method preferred by M. ST. YVES, in Lib. *De Morb. Oculor.* pag. 195.

C H A P. LII.

Of SCARIFYING the EYES.

I. SCARIFICATION of the Eyes agrees, in many Respects, so much with the Bleeding of them, described in the last Chapter, that it is no great Wonder Mr. WOOLHOUSE, though a famous Oculist, should confound them one with the other^a. But I think there is a manifest Difference, at least enough for any one to distinguish betwixt them, because the Parts are different; for the interior Surface of the Eye-lids are here the Subject of Scarification, as well as the White of the Eye, to which the foregoing Operation is confined: And then again they are each of them performed by different Instruments, as will presently appear.

Coincides
much with
the last
Operation.

II. That Scarification of the Eyes is no modern Invention, is apparent from its having been described and performed by HIPPOCRATES^b, CELSUS^c, ÆGINETA^d, and others among the antient Physicians. But there are several Reasons to be offered for its having come into Disuse with the Physicians of the succeeding Ages. It might be owing partly to its seeming a difficult, dangerous, and very painful Operation, and partly from their judging it to be of little or no Efficacy, as we find by many of their Writings. However, the first that revived the Practice among the Moderns, after it had lain neglected for so many Ages, was the celebrated *English* Oculist Mr. WOOLHOUSE.

Not a new
Operation.

III. To scarify the Patient's Eye, he must be first seated on his Chair or Bed in an advantageous Posture against the Light, with his Head secured from moving by an Assistant: After which the Operator presses his Thumb and Fore-finger on the Eye-lids, so as to elevate, or open, and turn them outward, that their interior red Surface may come into View; which may be done with most Ease in the lower Eye-lid. He now takes his scarifying Instrument in the other Hand, and rubs it backward and forward with great Swiftnes upon the internal Surface of the Lid, and upon the White of the Eye itself, if he thinks proper, and sometimes even upon the *Cornea*, moving from one Corner of the Eye to the other, so as to lacerate the small turgid Veins, and make them bleed plentifully. But this in general is an Operation much sooner learned from Inspection, than a verbal Description.

Method of
Operating.

IV. The Discharge of Blood from the scarified Vessels should be promoted as much as possible by the Applications proposed for that Use in the preceding Chapter, at Sect. IV. which will also cleanse the Eye, and abate its Inflammation at the same Time. But, in order to prevent the scarified Parts from adhering to each other, they should not be bound up, at least in the Day-time, but the Lids ought to be frequently agitated by the Patient: And if they are bound up at Night, you ought, first, to interpose a Bit of Gold-beaters Skin, or some such Substance, to keep them asunder. Mr. WOOLHOUSE recommends the Interposition of three or four Seeds of Clary for this Purpose, or rather a Bit of Gold-beaters Skin anointed with some Eye-salve: For without some such Precaution, you will hardly avoid Concretion or Adhesion of the Parts scarified.

Treatment
after the
Operation.

^a See MAUCHART *De Ophthalmoxysi*, pag. 17.

^b Lib. *De Visione*.

^c Lib. VI. Cap. 6. N. 26.

^d Lib. III. Cap. 22. *De Trachomate*.

How long the Scarification must be continued, or how often repeated, will belong to the prudent Physician to determine, from the particular Circumstances of the Case. But in the mean time it will be highly necessary to call in the Assistance of a proper Regimen, Diet, and Exhibition of both external and internal Medicines; for, by neglecting these Helps, your Operation may not only prove ineffectual, but perhaps induce a worse Disorder on the Eye. Consult PLATNERUS's Dissertation *De Scarificatione Oculorum*, pag. 36, & seq.

The Instruments to be used.

V. The Instruments used by different Authors for this Operation, are various. HIPPOCRATES seems to have used a Sort of prickly Thistle, like the *Atrachylis*^a. Some of the antient Physicians scarified with a small Steel Rasp in the Shape of a Spoon: See *Tab. XVI. Fig. 5.* with which they rubbed the internal Surface of the Eye-lid till it bled, as we read in CELSUS (*Lib. VI. Cap. 6. N° 26.*) and ÆGINETA *Lib. III. Cap. 22.*) the first of which Authors call it *Specillum asperatum*, and the last *Blepharoxyston*. Others use the rough Plant, named by Botanists *Equisetum magis nudum*, which seems to be very well adapted to the Intention. Others again recommend the Pumice-stone, *Os Sepiæ*, &c.

The latest and best Instrument.

VI. But the latest and best Instrument for this Operation is found to be the Beards of Barley or Rye, which are furnished with Rows of small Teeth or Hooks denoted by A in *Fig. 3. Tab. XVI.* Ten, twelve, or fifteen of these Beards are to be cut and tied together by a String, so as to resemble a Sort of Brush for Clothes, as in *Tab. XVI. Fig. 4.* the Teeth of each Beard or Spike being turned outward all round, their slender Ends form a Sort of Handle A, to be held and worked round and across by the Fingers, to scarify the Inside of the Eye-lids, and the Eye itself with the Part B. Hence this Scarification of the Eyes is, by the modern Surgeons, not improperly called *Ophthalmoxysis* or *Blepharoxysis*.

Is Inventor.

VII. The first Contriver of this Brush for the Eyes appears to be Mr. WOOLHOUSE, the Oculist: Who, though he preached up the great Uses of his Instrument to his Pupils, yet studiously endeavoured to conceal it, and its Application, from them. Till, in 1726, M. MAUCHART (present Professor at *Tubingen*, and Archiater to the Duke of WIRTEMBERG) his *quondam* Pupil, published both his Instrument and its Uses, with the Method of applying it. About two Years afterwards, the celebrated PLATNERUS of *Leipsic* explained the whole Business more at large, in a Treatise *De Scarificatione Oculorum*: In which we have the Figure of the Eye-brush used by Mr. WOOLHOUSE, as you find it represented by me in *Tab. XVI. Fig. 4.*

Uses of the Eye-brush.

VIII. This Eye-brush, or Scarificator, is said by the Author, Mr. WOOLHOUSE to be very useful in all Disorders of the Eyes which require Bleeding: As when the small Vessels are obstructed, and the whole Eye inflamed, whether from external or internal Causes, as a Blow, Wound, Cataract, Pterygium, Hypopyon, Staphiloma, or the like. In all which Cases, the internal Surface of the Eye-lids should be chiefly scarified, in order to discharge the hesitating Blood. And, if I may credit Mr. WOOLHOUSE, this Practice is more effectual in removing Inflammations, induced by external Causes, or a Chirurgical Operation, than

^a See MAUCHART, lib. c. pag. 6, & seq. PLATNER, l. c. pag. 25.

in original Ophthalmias or Inflammations of the Eyes. But in the *Chemosis*, or most violent Inflammation of this Organ, it will be necessary to scarify the Eye itself with this Brush, as well as the internal Surface of its Lids. 2. He assigns the Use of his Brush to be for the Removal of the Pterygium, Abscesses, and white or other coloured Specks and Films on the Eye. For, by scarifying the *Tunica albuginea* of the Eye, and sometimes the *Cornea* itself, or rather the *Pterygium* upon the *Cornea*, the Vessels which supply those Impediments and Blemishes of the Sight are lacerated, and, with the Use of other Medicines, destroyed; and consequently they must, in a little Time, dwindle and disappear. 3. He judges his Instrument highly serviceable in strengthening and recovering a weak or impaired Sight; or even to remove an *Amaurosis*, or Cataract, which are not of any long standing: For, by the strong Stimulus of this Operation, and stagnant Humours are put into Motion, the obstructed or compressed Nerves and Blood-vessels are again opened, and rendered pervious, and the Eye, by that Means, restored to its pristine Vigour. 4. The *Ophthalmoxysis*, or brushing up of the Eye, is very serviceable for the Cure of an *Atrophe*, or *Tabes* of that Organ; as it occasions a greater Influx of Juices to the Parts, which are therefore supplied with more Nourishment. 5. This Operation may contribute to the Cure of an *Hypopyon*, or *Hypohæma*, that is, a Collection of Blood or Matter under the *Cornea*, occasioned by some Blow, or other external Violence, which must be dispersed, in order to clear the Sight. 6. This is no despicable Remedy for easing and removing intense Pains, termed by the Antients *Ophthalmoponia*, and when the Light itself is intolerable to them: For this being an internal Inflammation of the Eye, caused by an Obstruction and Distention of the Vessels near the *Retina*, the Blood discharged by scarifying with this Brush must certainly draw off what is superfluous, and greatly ease this sensible Part. And lastly, 7. The Brush will be often found very useful and necessary in Palsies, incipient Mortifications, and many other Disorders of the Eye-lids, as well as of the Eyes themselves. See PLATNERUS *De Scarificatione Oculorum*, pag. 37, & seq.

IX. But it is not to be imagined this Instrument will be useful in all Disorders of the Eyes indiscriminately, as PLATNERUS, WOOLHOUSE's Pupil, observes. When Scarification is improper. For it will be improper, 1. in a dry *Lippitudo*, or *Xerophthalmia*, where the Eye is hot, dry, itches, and the Patient cannot look at the Light without great Pain. It will be also equally improper, 2. in Disorders of the Eyes from a *Venerereal* or *Scorbutic* Cause: For, unless the Vices of the Juices be first corrected and removed, as this Operation augments their Influx upon the Parts, it may increase, rather than relieve the Disorder. Nor will it be to any Purpose to try the Brush, 3. in an old *Cataract*, *Gutta serena*, or *Hypopyon*, where the Disorder is become fixed and incorrigible by Length of Time. And, lastly, you must not expect it to cure, 4. an *Ectropium*, *Trichiasis*, *Anchylosis*, and many other Disorders of the Eye-lids, for which it is not designed.

X. With regard to the Eye-brush before described, it is to be observed, that a small Force will blunt it, and therefore it cannot well be used more than once: A new Brush must be provided against every Operation. 'Tis to be likewise observed, that the Beards of old Barley are not so proper as those of new, which is not altogether full ripe: Because the first, being very brittle, will be apt to shatter, and leave some of its Teeth behind in the Coats of the Eye,

which may be followed with bad Consequences. For the same Reasons also it should not be the Product of too rich a Soil, nor have passed under the Action of the Flail in thrashing the Grain.

My Opinion
of the Ope-
ration.

XI. After all, I must confess, that, upon Trial, I never could experience any great Effects from this Operation, which I have frequently performed in most Disorders of the Eyes. And, what is more, I have known many Patients afflicted with various Disorders of the Eyes, which have been reported, by WOOLHOUSE, and his Pupils, to be cured by this Practice, when the only real Advantage they received from it, was the Abatement of their Pain: Which I take Notice of thus openly, lest it might be imagined, I did not succeed for want of operating as I ought, in the Manner of Mr. WOOLHOUSE. I must indeed own, that it makes an useful Evacuation in *Ophthalmias*, and that I have often experienced its good Effects in many inflammatory Disorders of the Eyes, especially when assisted with Phlebotomy and Blisters: And thus I make no doubt but its Author and his Followers may have cured many Diseases of the Eyes. But it may, in general, be questioned, whether those Disorders would not have gone off as readily by Bleeding, Purging, Blisters, and Scarification in other Parts, as by this Practice: At least the Difference will hardly countervail the extraordinary Pain it gives. We know, that Disorders of the Eyes were very well cured before the Discovery of this Practice by Mr. WOOLHOUSE, and may perhaps be better removed at present by some, who are ignorant of his *Apparatus*. At least this I may venture to say, that if, with Difficulty and much Persuasion, you draw in the Patient to submit once to so rough an Operation upon so tender an Organ, you will not find it practicable to allure him to it a second Time. Children in particular, who yet are more subject to Disorders of the Eyes than Adults, are scarce ever prevailed on to undergo the Operation: And Female Patients are extremely averse to it. Nor shall I insist upon the ill Consequences attending the Teeth of the Instrument's being left sticking behind in the Coats of the Eye, and the wounding of the *Cornea*, &c. from the intense Pain obliging the Patient to move his Head and Eye, which may cause an Inflammation even worse than the Original. Even the most prudent Oculists are obliged to own, that the Practice is beset with many Inconveniencies in the very Disorders to which it is most adapted: Nor can we meet with Examples enough of its good Effects to over-balance the Danger and excruciating Pain that attends it. I would therefore advise the young Surgeon not to be over fond of his new Eye-brush, nor bring it into his Practice but in Cases of the last Necessity, when all other Means are ineffectual. It is also remarkable, that among the modern *French* Surgeons and Oculists, none take any Notice of this Practice but ST. YVES, notwithstanding it made so much Noise at first. In general, the *French* Surgeons are very scanty and defective in treating on Disorders of the Eyes.

CHAP. LIII.

Of the EPIPHORA, or WATERY EYE.

I. **T**HE *Epiphora*, or watery Eye, is a Disorder, in which the Tears, being ^{Nature of the Disorders.} obstructed from passing through the lacrymal Ducts into the Nose, are forced to run down over the Cheek with Deformity and Uneasiness to the Patient. There are some indeed who confound this Disorder with the *Fistula lacrymalis*; but unjustly; because in the last the Tears are not sincere, but mixed with a purulent Matter flowing from an Ulcer in the lacrymal Sack. But, that the Nature of both these Disorders may be the better understood, it will be proper to give you an Idea of the Course and Figure of the lacrymal Ducts, as you will find them represented in *Tab. XVI. Fig. 6.* where *aa* denote the *Puncta lacrymalia* in the Eye-lid, *b* the *Caruncula lacrymalis*. *Fig. 7* and *8.* represent the lacrymal Ducts of each Eye separated and here entire: *aa* denote the *Saccus lacrymalis*, as it is called; *bb* the *Puncta lacrymalia*, with their small Tubes or Ducts, *cc*, leading into the lacrymal Sack. The Letters *dd* denote the *Canalis nasalis*, opening into the Nose by the Aperture *ee*. In *Fig. 9.* you have a View of these Ducts annexed to the Eye, where the lacrymal Points are marked *aa*; the Caruncle *b*; the Ducts from the *Puncta lacrymalia* *cc*, leading into the *Saccus lacrymalis* *d*, thence into the *Canalis nasalis* *e*, and by that into the Nose through the Aperture *f*.

II. This Disorder of the Eye may proceed from many Causes, which impede ^{Causes.} or obstruct the Passage of the Tears into the Nose through the before-described Parts. Thus, if the *Puncta lacrymalia* are stopped up, it will produce an *Epiphora*, or watery Eye. But as long as the Passages into the Nose are clear, that Humour, which is separated by the lacrymal Gland, to moisten and cleanse the Eye, will be drank in by the lacrymal Points, conveyed from thence into the Sack, and from thence it will, by Degrees, pass into the Cavity of the Nose itself. The *Epiphora* may therefore proceed, (1.) From some hard Tumor or Tubercle, as the *Encanthis*, in the greater Canthus or Angle of the Eye, obstructing the *Puncta lacrymalia*. (2.) From a Contraction or Concretion of the *Puncta*, after a Wound, Ulcer, or Burn of the Eye-lid: And (3.) From the same Causes, or from an Obstruction of the *Canalis nasalis*; as may frequently happen in an Inflammation, from an inspissated or gummy Matter. (4.) It may be caused by a Polypus, Caruncle, or Excrescence in the Nose, compressing and occluding the lacrymal Duct internally. (5.) From a *Fistula lacrymalis*. (6.) An *Ectropium*, or Inversion of the Eye-lids. (7.) From an Erosion, or Loss of the *Caruncula lacrymalis*. And, lastly, (8.) From a Wound in the lacrymal Duct, blocking up the same with an ill-formed Cicatrix.

III. The Disorder itself may be readily discovered both from the Looks and ^{Diagnosis.} Relation of the Patient: But, to find out its immediate Cause, requires much more Attention. When it arises from a Loss of the lacrymal Caruncle, a Dis-

^a This Passage of the Tears is by many thought to be a modern Discovery. But the celebrated Anatomist MORGAGNI, in his first and sixth *Adversaria Anatomica*, has demonstrated the Course to have been known and observed by GALEN, VEGETIUS, BERENGARIUS, FALLOPIUS, CARCANUS, STENO, &c. After MORGAGNI this Part has been explained at large by ANELIUS, in *Lib. De Fistula lacrymalis*, and MEIBOMIUS, in *Epist. De Vasis Palpebrarum novis*.

tortion of the Eye-lids, an Encanthis, or a Polypus, in the Nose, the Cause is generally obvious enough. But when it is from a Concretion of the *Puncta*, the Cause can only be known by Inspection, and considering whether there has been any Wound or Burn, &c. When the *Puncta* remain open, and the nasal Canal is concreted or obstructed, the Tears have a ready Admittance into the Saccus, but not into the Nose: Which therefore distend or dilate the Sack, from whence the Disorder is sometimes named a *Hernia lacrymalis*; and by ANELIUS it is termed a *Hydrops Sacci lacrymalis*^a. In this Case, upon pressing the Finger on the lacrymal Sack, it does not discharge its Contents into the Nose as it ought, but the Tears return again through the *Puncta* into the Eye. See *Tab. XVI. Fig. 10. A.* Sometimes the lacrymal Sack is thus dilated, so as to form a very conspicuous Tumor externally; which, by Pressure with the Finger, will for the present be greatly diminished, or else totally disappear. If the Disorder is at the same time accompanied with a *Fistula lacrymalis*, the aforesaid Pressure will discharge a purulent Matter along with the serous Humour: Whereas in the simple Epiphora, it will appear quite limpid and aqueous.

Prognosis
and Cure.

IV. The Prognosis and Treatment of this Disorder will turn out various, according to the particular Cause and Circumstances. When accompanied with an Encanthis, Polypus in the Nose, a Distortion of the Eye-lids, or a *Fistula lacrymalis*, the Epiphora cannot be cured, till you have first removed those Symptoms which cause it. When it arises from a Concretion of the *Puncta lacrymalia*, you should carefully examine whether the Ducts leading into the Saccus, marked *cc*, *Fig. 7* and *8*, are all along closed and concreted, or whether their Orifices only are occluded with a thin Film. For, if they are all the Way concreted, whether from a Cicatrix, Wound, or Burn, there will be no Possibility of a Cure: Whereas the thin Skin occluding their Orifices, may be easily perforated with a small Needle, and kept open, till they are healed, with a Bristle, or Silver Wire, dipped in *Ol. Ocr.* as at *Fig. 11, 12, 13.*

Obstruction
of the Duct.

V. If the *Puncta* appear to be pervious, and in their natural State, you may conclude the *Canalis nasalis* to be obstructed: Which being usually occasioned by a glutinous Matter, may be generally removed, so as to cure the Disorder, if it has been too long neglected. To disperse and remove the Matter, Discutients must be often applied with repeated Pressure by the Finger, to expel the stagnant Humours, that they may not become acrimonious, erode the Membranes, and bring on a *Fistula lacrymalis*. One of the best Discutients for this Purpose is a Tincture of Aloës diluted in some Eye-water, or an Infusion of Hyssop, Betony^b, or some mineral Waters, or the Salis extracted from them mixed with an Eye-water, &c. In the mean time should be sometimes used a Sternutatory *ex Majoran. Lil. Conval. Mar. Majoran. Hellebor. &c.* And if these Means prove ineffectual, you may treat the Patient in ANELIUS's new Method of curing a *Fistula lacrymalis*, by passing a small Silver Probe, *Tab. XVI. Fig. 11, 12, 13*, into the *Puncta*, and through the lacrymal Duct and Sack into the *Canalis nasalis*, and so into the Nose. But this is an Operation that ought not to be attempted by every one, who is not an expert Operator, and well versed in the Structure of these Parts: Otherwise you not only miscarry in your

^a In *Dissert. sur la nouvelle Decouverte de l'Hydropisie du Conduit lacrymal.* Paris 1716.

^b This Infusion is highly commended by SCHOBINGERUS, for a *Fistula lacrymalis*, in his Treatise on that Subject, p. 20.

Operation,

Operation, but greatly injure the Patient^a. The Passages are to be thus cleared by the slender Probe every Morning and Evening, for several Days, injecting afterwards some of the beforementioned Liquors by a small Silver Syringe, *Tab. XVI. Fig. 14.* the slender Tube of which is to be inserted into the lower *Punctum lacrymale*, as we shall more particularly direct in the following Chapter. And thus, by the repeated Use of Injections, the Disorder will be either removed, or else degenerate into a *Fistula lacrymalis*, and must then be treated accordingly. Lastly, when this Disorder arises from a Loss of Substance in, or an Erosion of, the lacrymal Caruncle, it will be to no Purpose to use Remedies, because the Case is incurable. *Vid. HEBENSTREIT. Dissert. De Ocul. lacrym. Lipsiæ 1743.*

C H A P. LIV.

Of the FISTULA LACRYMALIS, and of the Disorders related to it.

I. **T**HE *Fistula lacrymalis* is generally understood to be a little Ulcer in the greater or internal Canthus of the Eye next the Nose, which either of itself, or by Pressure, discharges a purulent Matter. The Seat of this Ulcuscle is in the *Sacculus lacrymalis*, or Passage for the Tears into the Nose. Therefore the *Fistula lacrymalis* is more or less dangerous, in Proportion to the Size and Condition of the Ulcer, which sometimes lies concealed only in the *Sacculus*, and discharges its Matter through the *Puncta lacrymalia*: But sometimes again it not only erodes the *Sacculus*, but also the external Skin, and the adjacent Bone. If the Skin is not eroded through, the *Fistula* is thence denominated *imperfect*; as it is termed *perfect* after having made its Way through the Integuments^b: But when it has also eat through the adjacent Bone, or rendered it carious, it is then usually termed a *complicated Fistula lacrymalis*. It is remarkable, that the generality of Physicians and Surgeons had a wrong Notion of the Nature and Treatment of this Disorder, till the Beginning of the present Century. Their Error might be owing partly (1.) To the Multiplicity of Diseases to which this Part of the Eye is subject, and the Number of different Names which are frequently given to each of them. (2.) To the real Nature of the Disorder, having been examined into by very few Surgeons and Anatomists: For most of them imagined the Seat of the Ulcuscle to be either in or under the lacrymal Caruncle: Whereas the more accurate of the Moderns discovered, that the purulent Matter was discharged neither from nor behind the Caruncle, but rather out of the *Sacculus lacrymalis* through the *Puncta*^c. Having acquired a wrong Idea of the Disorder, they were consequently led by that into a wrong

The *Fistula lacrymalis* described.

^a Yet this Operation is far from being impracticable, as many Surgeons not well versed in these Disorders (and among the rest GARENGEOT) would fain persuade us. For to say nothing of ANGE-LIUS, I myself have often and often performed it upon Numbers of Patients.

^b This Species of the *Fistula* is what CELSUS (*Lib. vii. N. 7.*) seems to term *Aegilops*: But he does not speak very intelligibly of it in this Place.

^c FALLOPIUS was perhaps the first Anatomist that observed this, in *Tom. II. p. 224.* See also MORGAGNI, *Advers. Anat. VI. 64.*

Practice:

Practice: Both which the Moderns have endeavoured to correct, and not without Success.

The different Names and Kinds of the Disorder.

II. But that our Reader may be a better Judge of the false Opinions which have been entertained and advanced concerning this Disorder by the principal Writers in Surgery, we shall endeavour briefly to relate them: And, first, some of them have by the Name of *Fistula lacrymalis* understood that Kind of Disorder which we term *Epiphora*, or the watery Eye, and have described in the preceding Chapter. (2.) Others seem to use the Terms *Fistula lacrymalis*, *Anchylops*, and *Aegilops*, as synonymous; so that there is no Possibility of knowing their Meaning, till we are furnished with the proper Distinction and Explanation of those Disorders separately. For the *Anchylops* is, by the generality of the modern Writers, used to signify a Tubercle in the greater Canthus of the Eye next the Nose, whether it be seated in or near the lacrymal Sack, or whether it be with or without an Inflammation accompanying it. It ought to be here observed, that the *Sacculus lacrymalis*, as well as other Parts, is subject to encysted Tumors, Inflammation, and Abscess, and very often to a Distension or Rupture, now termed a *Hernia lacrymalis*; (see *Tab. XXVI. Fig. 10. A B.* and *Fig. 16 and 17.*) in which last, upon pressing the Finger on the Tumor, it subsides more or less, and the serous Humour discharges itself either through the *Puncta lacrymalia* at the Eye, or into the Cavity of the Nose, or both Ways. We define an *Aegilops* to be a small Tumor formed after an Inflammation or Abscess in the greater Canthus of the Eye, near the *Sacculus lacrymalis*; which in Time, by the Acrimony of its purulent Matter, erodes the external Skin and lacrymal Ducts, sometimes eats away the Fat round the Globe of the Eye, and sometimes renders the *Ossa plana*, and other Bones near the Nose, carious to a dangerous Degree. Sometimes the upper, lower, or both of the lacrymal Ducts, are so eroded, as to discharge large Quantities of purulent Matter through the *Puncta* in the greater *Canthus*: And then it forms the *Fistula lacrymalis*, whose Characteristic is a purulent Matter. But, when the discharged Humour is quite limpid and aqueous, the Disorder ought then to be denominated an *Epiphora*, as we observed in the preceding Chapter. (See *Fig. 18. lit. a and b.*) From what we have here advanced, I think it will not be difficult for any one to distinguish the different Disorders of this Part; which, from their Affinity, are very often confounded by Physicians and Surgeons.

Causes.

III. An *Anchylops* may proceed from many Causes: And, among others, an Inflammation or encysted Tumor may produce this Disorder, as well as occasion a simple *Fistula lacrymalis*, or an *Aegilops*. Yet the first arises still more frequently from a Relaxation and Distension of the lacrymal Sack: So that we generally meet with an *Aegilops* and *Fistula lacrymalis* fixed in the greater Canthus of the Eye at one and the same time: This seems to arise from an Obstruction of the Passage of the Tears, or purulent Matter, into the Nose: The Consequence of which must be an Extenuation and Tumor of the lacrymal Sack. An *Aegilops* is generally caused by a previous Inflammation or Abscess, which frequently erode the lacrymal Ducts and the external Skin, and even produce a *Fistula lacrymalis* in its worst Degree. But though there are many more Causes besides Inflammation, which may produce a *Fistula lacrymalis*, yet there is no Cause so frequent or immediate as an Exulceration of the lacrymal Sack, or of the adjacent Membranes. But when once the lacrymal Ducts are eroded, the Matter finds

finds an immediate Passage into the subjacent *Sacculus*, as at *Fig. 18*. A *Fistula lacrymalis* may also frequently proceed from an Obstruction of the inferior lacrymal Duct, termed the *Canalis nasalis*, *d d*, *Fig. 7* and *8*. from whatever Cause that Obstruction may arise. For no Obstruction can be formed, without inducing a Stagnation of the Humour, which will therefore become acrid, distend the Duct, and either erode, or totally destroy, its Membranes. And in this Manner the Disorder is frequently occasioned in many Patients who have had an Inflammation in their Eyes, in the Membranes of their Nose, or in these Ducts themselves, or when those Parts have been injured by the Small-Pox, as I have frequently observed: Though it must be confessed, that the Disorder sometimes arises spontaneously, without the Assistance of any of the beforementioned Causes.

IV. There are various Species of these *Fistule*. The first Distinction of them is, (1.) Into *perfect* and *imperfect*: The former of which is, when the purulent Matter flows out through an Erosion of the Skin in the Canthus; and the latter, when the Matter is discharged through the *Puncta lacrymalia*, the Skin remaining entire: Which last Kind is generally accompanied with a Tumor of the lacrymal Sack. You may have an Idea of the perfect Kind, from consulting *Tab. XVI. Fig. 19. a b*. Some of these *Fistule* are again distinguished into (2.) *Simple* and *Compound*; the last of which is, when a Callosity, Caries, or the like, attend. Some again are, (3.) *Mild* and *recent*; others *old* and *malignant*. (4.) Some *intermitting* and *periodical*; others *continual*. Still more Distinctions of the several Species of this Disorder may be seen in *p. 8*. of our professed Dissertation on the Subject in 4^{to} 1716, at *Altorf*. We have still another Distinction of these *Fistule* into *true* and *false*, made by M. GARENGEOT: By the *true*, he understands an Ulceration of the lacrymal Ducts; and by the *false*, he intends an Ulceration in the adjacent Parts only, which we term an *Aegilops*. Some^a will have a Callosity essentially necessary to the Formation of a *Fistula lacrymalis*; because a Callus is constantly found in most other *Fistule*: But this is not the common and received Notion of a *Fistula lacrymalis*, as we are taught by the Authorities of CELSUS, FALLOPIUS, CARDAN, WOOLHOUSE, and MORGAGNI, *advers. Anat. VI. p. 82*. and from daily Experience. M. ST. YVES^b, the late famous Oculist at *Paris*, asserts, that he seldom found a Callus in these *Fistule*: And I myself have observed a great many, and those inveterate lacrymal *Fistule*, which have yet had no Callosity. There are some Surgeons again, who imagine that there never can arise a *Fistula lacrymalis*, without an Obstruction of the *Canalis nasalis* at the same time, because such an Obstruction must be the Occasion of the *Fistula*. But even this Opinion is without Foundation, as hath been long ago evinced by the Authorities of the best Writers, and as I have been frequently assured by Experience: For I have often observed, and am now acquainted with some of these *Fistule*, in which the purulent Matter has a free Exit from the lacrymal Sack through the *Puncta lacrymalia*, if you press it with the Finger every Day; and at the same time the *Canalis nasalis* appears to be open, because the purulent Matter is also discharged through it into the Nose^c.

^a AS SIGNOROTTUS and PLATNERUS, in *Diff. de Fist. lacrymali*, Sect. I, 2, 3.

^b See his *Traité des Maladies des Yeux*, pag. 59. and SCHOBINGERI *Diff. de Fistul. lacrym.* p. 3.

^c Some will have it, that the purulent Matter flows only through the upper, and others only through the lower *Punctum lacrymale*; but it has generally a Passage through both, though often more is discharged through one than the other.

Signs of the
Fistula lacrymalis.

V. Having in general described and explained the several Kinds of these *Fistulae*, and the Disorders related to them, we shall now proceed to the Signs by which they are discovered. And first, you may be pretty well assured, that the Patient has a lacrymal *Fistula*, if he complains of the Tears being more copious than usual, and running over his Cheek, and that a Quantity of purulent Matter is found collected in the Eye, in a Morning chiefly; and at the same time you observe no Appearance of Inflammation: But if you press the lacrymal Sack with your Finger, it discharges a Quantity of purulent Matter by the *Puncta lacrymalis*. This appears to me the most certain Sign of a *Fistula lacrymalis*: And with me FALLOPIUS, WOOLHOUSE, and ANELIUS concur. You may judge whether there be any Caries from the ill Smell, and from the livid or blackish Colour of the Part, with the Discharge of purulent Matter: And especially, if the Bone appears bare or eroded to the Eye or Probe, in open *Fistula*. The Colour of the Matter discharged is so far from giving a sure Indication, whether or no the Bone is carious, that I have often found it of a good Colour, when at the same time the Bone appeared rough and eroded to the Probe: But you may be generally assured, there is a Caries of the Bone, if the *Fistula* has been of very long standing, and discharges a large Quantity of Matter. But the Seat of the Caries is not always the same, being sometimes in the *Os lacrymale*, sometimes in the *Os planum*, and in the *Os maxillare superior*. You may discover whether the *Canalis nasalis* be obstructed, from little or none of the purulent Matter, or injected Liquor, being able to make its Way into the Nose, but all returning through one of the *Puncta lacrymalia*^a. A Callus in these *Fistulae* may be discovered by the unusual Hardness or Resistance which the Parts give to the Finger; but this is not a frequent Symptom in lacrymal *Fistulae*, as hath been often observed by ST. YVES, M. GARENGEOT, and myself. If these Parts are infested with an encysted Tumor, they appear preternaturally enlarged, and harder than usual, nor does the Tumor subside by pressing it with the Finger; and there appears no Sign of Inflammation. But if the Tumor subsides by Pressure with the Finger, you may conclude there is a *Hernia lacrymalis*, or Dilatation of the lacrymal Sack. Lastly, an *Aegilops* is discovered by the Appearance of an Exulceration in the Greater Canthus of the Eye next the Nose, without affecting the lacrymal Ducts.

Prognosis.

VI. The several Disorders before enumerated usually terminate differently, according to particular Circumstances. But as the Eye itself, and the spongy Bones of its Orbit, are so nearly situated, it is hardly possible the Patient should escape a Caries in the last, with many grievous Symptoms in that Organ itself. An *Anchylops* or *Aegilops* may very easily degenerate into a *Fistula*; and a slight *Fistula* may become obstinate, malignant, and even cancerous; which having destroyed the Bones, there are then but little Hopes of obtaining a Cure. These Disorders are in general more or less malignant, according as the Patient is of a good or bad Habit of Body, as the Matter of the *Fistula* is more or less acrimo-

^a I observed an uncommon Species of the *Fistula lacrymalis* here in a Student, Anno 1726; in which, though the Disorder had been of eight Years standing, yet no Matter could be discharged by pressing with the Finger. The Tears constantly issued down upon his Cheeks, and after Sleep the Eye was found replete with a purulent Matter: But when a Quantity of Liquor was injected at either *Punctum*, it ran out with some purulent Matter through the other. There was no Tumor of the lacrymal Sack; but, upon incising the Integuments, the lacrymal Bone was found carious.

monious,

monious, and as to the Patient is more or less regular in his Diet and Course of Life. If the Patient is in other Respects well, the Disorder recent, and without a Caries, Callus, or other bad Symptoms, there is no great Danger: But the Disorder may be cured, by the Method of ANELIUS, in a few Day's time. The perfect or compleat Fistula which has eroded through the Skin, is generally attended with a Caries; and is therefore hardly, if at all, curable, before the carious Bones are removed. Also a Callus must be first removed before you can cure those *Fistulae* in which it is found. But if both Callosity and Caries are absent, a Cure may be obtained with much more Ease and Expedition. Again, in general, the older or more inveterate the Fistula, the more difficult it is to cure; because in them the Bones are commonly infested with a Caries: And if that is not perfectly removed, though you should, in Appearance, cure the Disorder, it will quickly return again. But what is more than a little surprising, there are some Surgeons who write, that several of these *Fistulae* which have been accompanied both with a Callus and a Caries, have been cured barely by leaving the Disorder to Nature^a. Unless the *Canalis nasalis* be rendered pervious, and kept open, the Cure cannot be compleated: For though you remove the Callus and Caries by the Knife or Cautery, the Patient will be afterwards troubled with a watery Eye, in which the Tears run down over the Cheeks. The compressing Instruments formerly used to relieve this Complaint, do little more than molest the Patient, or frequently turn a mild into a malignant Fistula. But the Practice of the modern Surgeons is greatly to be preferred before that of the Antients in this Disorder: For the First being reformed by the Authority and Example of ANELIUS, about the Year 1712, have ever since continued to cure recent *Fistulae* of this Species after his Manner, without either the Use of the Scalpel, Terebra, or Cautery, provided there is no Callus or Caries in it, notwithstanding what others may say to the contrary. Whereas formerly they hardly ever cured a *Fistula lacrymalis* of any Kind, without the Use of one of those severe Remedies^b.

VII. If the Patient is troubled with an *Anchylops*, or Tumor or Inflammation in the greater Angle of the Eye next the Nose, the Surgeon must, in that Case, use his Endeavours first to disperse it, to prevent the Tumor from degenerating into an Abscess or Fistula. This Intention may be best answered towards the beginning of the Disorder, by moistening the Part with a little *Sp. Vitriol.* dipping a small Brush, or the End of the Finger therein, several Times in a Day, as in treating upon Tumors we directed for the Furuncle: But in this Practice you must be very careful to avoid injuring the Eye itself. Upon which Account it may, in some Cases, be safer to use a Liniment of *Mel. Rosar.* acidulated with *Sp. Vitriol.* covering the Part afterwards with a Diachylon Plaster. In most Cases, a Cure may be almost as readily obtained by frequent fomenting with Compresses dipped in warm *Sp. Vini Camph.* and a Cataplasim ex *Pomis coctis, vel assatis Camphoroque mist.* to be continued till the Tumor subsides, and the Inflammation is dispersed. If the Tumor should appear to be of the encysted Kind, you may treat it as we have directed in *Chap. XXVIII. Sect. I. N. VI.* and VII. foregoing: By which Method I happily extirpated a large encysted Tumor by the Scalpel, which was very deeply situated in the

Treatment
of the An-
chylops.

^a This does but very seldom happen. See more in MAITRE-JEAN, in *Lib. De Morbis Ocularum*, in *Cap. de Fistula lacrymali*.

^b See my Dissertation on this Subject.

Orbit of the Eye of a certain Maid. Lastly, when the Tumor arises from a Distention of the lacrymal Sack, you must treat the Disorder by the Methods we shall presently direct at N. X. following.

Treatment
of the Ægi-
lops.

VIII. If the last mentioned Tumor or Inflammation rather tends to Suppuration than to be dispersed by the preceding Treatment, it will then be proper to forward its Maturation or Conversion into Matter as much as possible, lest an obstinate Fistula, or worse Consequences, should be the Effects of too long Delay. The Suppuration of it may be conveniently promoted by a Diachylon Plaster with the Gums, or an emollient Cataplasm frequently applied warm. As soon as you can discover that the Matter is suppurated, you are to open the most depending Part of the Tumor, either with a Lancet or Scalpel, to discharge and press out the Matter, that it may not eat through its including Cyst, or the adjacent thin Bones. That being thus discharged, the Abscess or Ulcer must be next deterged by dressing with digestive Ointments, or *Mel. Rosarum cum Myrrha, vel Ung. Ægyptiac. seu Præcipitat. Rub. Portiuncula permist.* after which it may be healed with vulnerary Balsams, in the Manner we directed for Abscesses in general. If the Abscess in this Disorder should break of its own accord, as I have frequently known it to do, and its Aperture or Orifice appears too narrow to give a free Discharge to the Matter, it may be afterwards dilated with a Tent, prepared Sponge, Gentian Root, or rather by the Scalpel, and then treat it as before. If the Bone appears foul, it will be necessary to apply some scraped Lint, with a few Drops of *Sp. Sulph. aut Vitriol.* or a little *Pulv. Euphorb.* laying over it a Compress dipped in *Aq. Calcis*; by which Means having removed the Caries, the Wound will be disposed to heal. Sometimes it will be found necessary to exfoliate or scrape the foul Bone with the Rasp, represented in *Tab. VII. Fig. 3, 4, 5,* or *Tab. XVIII. Fig. 9.* Some Surgeons think it a more ready Method of Cure; to cauterise the Bone with red-hot Irons; adapted to a Tube or Case, as in *Tab. XVI. Fig. 21 and 22.* completing the rest of the Cure with Balsams or vulnerary Medicines, in the Manner we shall explain more at large in treating of this Disorder at N. XII. following.

Treatment
of slight
Fistulae.

IX. The Treatment of the true Species of lacrymal *Fistula*, in which there is an Ulceration of the lacrymal Passages, is various, according to the different Nature, Degree, and Circumstances of the Disorder. For when the *Fistula* is recent, the Patient of a good Habit, the Skin entire, and the Ducts not ulcerated or obstructed, but discharging freely a mucous, and not a purulent Matter into the Nose; you ought not, in these Circumstances, to have immediate Recourse to the Knife, Terebra, or Cautery, but first endeavour to cure the *Fistula* by the mildest Methods of Treatment, before you try the severer Operations of Surgery. In this Case, you should frequently express the Matter included in the lacrymal Sack by your Fingers; lest it become so acrid, as to erode the adjacent Parts by its too long Stay: And, in the Intervals, you should strive to cleanse or deterge the Parts by the repeated Use of the mundifying Remedies, which we advised for the watery Eye in *Chap. LIII. N. V.* At the same time, too, you must call in the Aid of Phlebotomy, Purges, Scarification, Blisters, Diet, and Regimen, according to the Patient's particular Habit and Circumstances.

Cure by
Compression.

X. M. DIONIS tells us, in his *Surgery*, that he has cured many of these recent *Fistulae*, particularly in Infants, barely by Compression in a proper Manner: And GARENGEOT also affirms the same to have been done formerly at *Paris* by that

that eminent Surgeon M. ARNEAU. By the first of these the Compression was made in the following Manner: 1. First of all he imposed a Piece of *Emplastr. de Minio* upon the Tubercle or Fistula of the lacrymal Sack: Then, 2. he applied a small triangular Compress of about the Thickness of one's Finger, or, instead of the one thick Compress, several thinner ones upon each other, in order to fill up exactly the Cavity in the Angle of the Eye next the Nose. In the next Place, 3. he adapted another Compress over the former, dipping both of them first in some *Aq. Calc.* or *Sp. Vini*. Lastly, 4. he firmly secured and pressed down the Compresses upon the Tumor by a strict Deligation with a circular Bandage; that, by this Means, none of the vitiated Humours might be collected or retained, and that the relaxed *Sacculus* might, by Degrees, recover its former Tone and Dimensions. But, according to M. DIONIS, this Treatment must be continued for several entire Months to cure the Patient. It is to be observed, that some use a peculiar Instrument for compressing the Parts disordered, instead of Compresses and Bandage: Of which Instrument there are several Kinds proposed by FABRIC. AB AQUAPENDENTE, SCULTETUS, PALFYN, and myself, in *Tab. XVI. Fig. 20.* taken from PLATNERUS. But, after all, this Method by Compressure will be to no Purpose when the lacrymal Ducts are concreted or obstructed: For the Advantage of this Practice can only take Place when there is an Abscess near the lacrymal Sack, as in *Fig. 18.* or at least when the lacrymal Ducts are found pervious.

XI. When the Disorder is become so malignant or inveterate as not to be relieved by the preceding Method of Compression, the general Practice of Surgeons in that Case was formerly, and now is, to lay open the Tubercle, or distended lacrymal Sack almost in the Middle, betwixt the internal Canthus and the Nose: And this either by Caustic, or rather by Incision with a Scalpel or a Lancet; but with great Circumspection, to avoid wounding the lacrymal Ducts and *Puncta*, which lead to the Sack, or the Ligament which fastens one Eye-lid to the other, which would greatly deform the Eye. 'Tis generally advised to make this Incision obliquely: As, for Example, from *d* towards *e* or *c.* *Fig. 9. Tab. XVI.* or in *Fig. 10.* from *B* towards *A*; for which some prefer the straight, and others the crooked Scalpel: But either of them will do, in my Opinion; for I have successfully performed the Operation with both. Your Incision must be continued downward, till you have penetrated into the Cavity of the lacrymal Sack, enlarging it afterwards both upward and downward into the aforesaid Direction from the Top of the Sack down to the *Canalis ossæus*. The Wound is next to be dilated by filling it with Lint (though PLATNERUS and GARENCEOT recommend a particular Instrument for this Use) and lastly the Dressings are to be secured with Compress and Bandage. There are others again who rather approve of making this Incision in a semicircular Form like an Arch, whose Convexity must be towards the Nose, and Concavity towards the Eye; beginning the Incision at the lower Part of the *Apophysis nasalis* of the *Os frontis*, where that Bone meets the *Os maxillare* and *lacrymale*, and continuing your Incision from thence, in the Form of an Arch, to the Meeting of the internal *Apophysis* of the *Os jugali*, as we have represented by the dotted Line *c b* *Fig. 19. Tab. XVI.* When your Incision is sufficiently enlarged by the Knife, you must dilate it further with Lint, as before: By which Means you have an Opportunity the next Day of observing, whether the Bones be carious, and in what Part

Cure by
Incision.

Part or Manner it will be best to perforate them. If the Wound should bleed much, you may apply a Pledgit of Lint dipt in *Sp. Vini rectificatiss.* to be retained on the Part with a Compress, and a little stricter Bandage. In the subsequent Dressings you must use *Essent. Succin. Ol. later.* and other detergent Applications, as we before directed for the *Aegilops*, at N. VIII. When the Parts are well cleansed, you may finish the Cure with some vulnerary Balsam and desiccative Plaster, retained with a thick triangular Compress, as we directed at N. X. and thus the Wound gradually heals. Others again apply the compressing Instrument beforementioned upon the Wound over the Compress and Plaster; but not very often with the desired Success, because the *Canalis nasalis* is generally hereby obstructed.

The antient
Treatment
of a callous
Fistula with
Caries.

XII. In a callous *Fistula lacrymalis* the Method of Treatment used by the antient Surgeons was, to open the Ulcer first, and then to dress it with *Trachisc. de Minio, Præcipit. rub. Ung. Egyptiac. Lap. infernal. &c.* with which they removed the Callosity, and then finished the Cure in the Manner we before directed. But if a Caries also accompanied it, they applied *Pulv. ex Euphorbio*, or *Sp. Sulphur. Vitriol. &c.* with scraped Lint. If these did not answer, they then rasped or scraped the vitiated Bone, as we directed at N. IX. or else applied the actual Cautery several Times, according as the Case required. The cauterizing Instruments used in this Disorder, were of various Figures, as the Surgeon best fancied: As you may see by those figured in *AQUAPENDENS, SCULTETUS, SOLINGEN, PALFYN, DIONIS, GARENGEOT, PLATNER, &c.* Some were used naked without any Tube, as those we have represented in our *Tab. III. Fig. 14 and 16.* Others again were furnished with a Tube, which was first placed in the Wound close to the Bone, and then the Cautery was conveyed through it, to avoid burning the Skin and Lips of the Wound: See *Tab. XVI. Fig. 21, 22.* The Eschars formed by the Cautery were afterwards separated by some digestive Ointment, and the Wound then healed with vulnerary Balsams, as we directed before. But in performing this Operation you should first not only bind up the Patient's sound Eye, that he may not be terrified at the Sight of the Cautery, but you should also secure the disordered Eye by an Instrument in the shape of a Spoon, *Tab. XVI. Fig. 23.* that it may not be touched by the Cautery. It will be also previously necessary to dry the Bone well with Lint before you apply the Cautery, which will otherwise be too soon extinguished. But, after all, this Treatment, in order to cleanse the Fistula by the Cautery, will be to little or no Purpose, so long as the *Canalis nasalis* remains obstructed. Nor can the Tears be discharged into the Nose, unless anew Passage be made for them by perforating the Bones with the Cautery: Otherwise the Patient will be continually molested with a watery Eye after the Fistula is cured: So that this Method of Cure will, in my Opinion, succeed best when the *Canalis nasalis* remains pervious and entire, or when there is a Suppuration without-side the lacrymal Sack. Therefore it will be highly necessary to distinguish those *Fistulae*, in which the *Canalis nasalis* is occluded, or shut up, from those in which it is not.

Cure by per-
forating the
Os lacry-
male.

XIII. To remove the last mentioned Symptom, the watery Eye, in the Cure of these *Fistulae*, some Surgeons have proposed the following Method: *viz.* After opening the lacrymal Sack, as we directed before at N. XI. the next Day they perforated the *Os Unguis* with a sharp-pointed Instrument for the Purpose,
(*Tab.*

(*Tab. XVI. Fig. 24. or Tab. VII. Fig. 7. or Tab. XXIV. Fig. 2.*) which is carefully passed obliquely through the upper and lower Part of the *Os spongiofum* into the Cavity of the Nose: After which they introduce and leave a small Tent in the Wound, which is frequently cleared and opened with a Probe; till being healed, it forms an artificial lacrymal Duct. Some remove the Caries, and make an artificial lacrymal Duct, at the same time, by the forementioned Instruments, or by a Director, without any actual Cautery: Which last is, however, used by some like that at *Fig. 21.* with the Tube *Fig. 22.* ^a with which the Bones are perforated, and a Passage made for the Tears into the Nose as before. Though these Methods of Cure are very troublesome and painful to the Patient, yet they are at present used as the best we are acquainted with. And *St. YVES*, the famous Oculist of *Paris*, treated his Patients in the same Method, as he informs us in his Treatise on *Disorders of the Eyes*.

XIV. But, in Consideration of the great Difficulty there is to persuade timorous Patients, especially those of higher Rank, to undergo the Severity and Fatigue of the forementioned Operations of Incision, boring, cauterizing, &c. *ANELIUS*, in the Year 1712, endeavoured to contrive a more safe and easy Method of curing these *Fistulae*, in favour of the Duke of SAVOY, who was then troubled with the Disorder. Which Method succeeded so well, as to cure not only recent, but even inveterate *Fistulae*, if not accompanied with Callus or Caries, and that even without the Severity of the Knife, Cautery, or Compression, in the following Manner.

ANELIUS's
new Method
of curing
lacrymal
Fistulae.

XV. He first provided himself with a slender Probe, in the Form of an Arch, made of small Silver-wire, as in *Tab. XVI. Fig. 11, 12, 13.* then placing the Patient in a convenient Posture against the Light, he opens the upper Eye-lid with the Fingers of one Hand, while, with those of the other, he introduces the crooked Probe through the upper *Punctum lacrymale* into the Sack; which may be done with more or less Difficulty, according as the Surgeon has before considered the Figure, or Position, and anatomical Structure of the Parts. After having introduced the Probe into the Sack, he gently agitates and presses it downwards, and towards the Nose, with a certain Slight, into the obstructed *Canalis nasalis*, which, by this Means, opened. These Ducts are much more easily opened by this Artifice, when they are only obstructed by Matter, or some glutinous Humour, than when they are totally closed and concreted, as is frequently observed in these *Fistulae* which are inveterate: For the last sometimes require the Probe to be pressed into them so forcibly, as to excite some Pain, and often set the Nose a bleeding a little ^b. But to prevent the newly-opened Duct from closing again, *M. ANELE* thinks it necessary to inject some Liquor every Night and Morning, or oftener; and then to repeat the Introduction of the Probe as often as it may be found necessary, till no more Matter issues from the *Puncta lacrymalia*: Which denotes the Ulcer to be cleansed, and the Ducts to have recovered their natural State.

The Use of
ANELIUS's
Probe.

^a See *SOLINGENIUS*, *PALFYNS*, and *GARENGEOT*.

^b *M. GARENGEOT* appears to be ignorant of the Use of these Probes, when he thinks they cannot open the Ducts, but only serve to search out the lacrymal Sack. See *N. XXV.* following. *STAHLIUS* was the first, who passed the Bristle through the *Puncta lacrymalia* into the lacrymal Sack; but not with the View of opening the nasal Duct.

Of the FISTULA LACRYMALIS. Part II.

XVI. To inject these Parts, I must recommend the Syringe, contrived by ANELIUS, and represented in *Tab. XVI. Fig. 14.* or else some other like it. The Tube A, in the anterior Part of this Instrument, is about the Thickness of a Hog's Bristle, and is to be inserted into the *Punctum lacrymale* of the lower Eye-lid, as being less moveable: In which Manner you force the healing Injection several Times into and through the lacrymal Sack, in order to wash out the Sordes, and render the Ducts pervious^a. To perform this Operation the more easily, your Patient ought to be placed against the Light, with his Head either erect, or a little inclined backward: And, if the Disorder be in the Right Eye, the Surgeon should stand on the Right Side of the Patient, and having filled the Syringe with a suitable Injection, he then places his left Ring-finger under the *Punctum lacrymale* of the lower Eye-lid, near the lacrymal Sack, and thereby draws down the Eye-lid, to bring the *Punctum lacrymale* into View; and thus he more easily inserts the Tube of the Syringe, and, at the same time, his Finger serves as a Fulcrum, or Support, to the others which move the Syringe. Having, in this Manner, secured the Eye-lid, the Surgeon next takes the Syringe by its Hinder-part C, betwixt the Fore and Middle-finger of his Right Hand, and carefully inserts the Tube A, in the lower End of the Syringe D, into the lower *Punctum lacrymale*: After which he presses the Handle of the Sucker B into the Syringe by the Thumb of the same Hand, so as to force the Liquor through the lacrymal Duct, Sack, and *Canalis nasalis* into the Nose; from whence it will run into the Fauces, and some Part of it will escape through the upper *Punctum lacrymale*. But to say Truth, the whole of this Method is much better and easier demonstrated by Practice, than expressed by Words. If the Disorder be in the Left Eye, the Surgeon must then stand on the Right Side of the Patient, and manage the rest of his Operation as before. If the Surgeon pleases, he may, for Variety, insert his Syringe, and inject by the upper *Punctum lacrymale*, after having turned it upward and downward by his Finger. But to inject by either of them as he ought, he should be provided with good sharp Eyes, and a dextrous Hand: Though he will find it the most easy of the two, to inject by the lower *Punctum lacrymale*.

What more
must be
done,

XVII. These two Operations of Probing and Injecting must be continued, or repeated every Day, till you find, 1. that the Injection will pass freely into the Nose without the Assistance of the Probe; and, 2. that there is no purulent Matter discharged either spontaneously, or by Pressure from the lacrymal Sack into the greater Canthus of the Eye. And then you may conclude, from these two Circumstances, that the Cure is completed: Which however is not always performed within the same time, but sooner or later according to the Nature and Degree of the Disorder. When mild, it is sometimes cured within four, eight, fourteen, or twenty Days; and sometimes longer. But there is hardly any lacrymal Fistula so bad, but it may, by this Means, be cured in Time, provided it be free from Callus and Caries. I have myself often cured these *Fistulae* in so short a Space as three Days, by this Practice: And have even found, by Experience, that this Method of ANELIUS will not prove altogether unsuccessful, even in those *Fistulae* which have a slight Caries. By this Method I cured a Girl of ten Years old, in the Year 1727, of an inveterate *Fistula lacrymalis*, with a

^a M. GARENCEOT (in *Cap. De Fist. Lacrym.*) advises the Tube of the Syringe to be agitated, till you have introduced it into the lacrymal Sack; but this is not necessary; it is sufficient you insert it into the *Punctum lacrymale*, or the Beginning of the Duct.

light

fighter Caries, which I injected every Day for six Months: The Patient is at this Day well, and married.

XVIII. In the perfect or complete Species of the *Fistula lacrymalis*, in which the external Skin is eroded or ulcerated, you may much more easily open the Passage of the occluded nasal Canal, than in the other Kind. For in this Disorder you may readily pass the forementioned Probe of ANELIUS, immediately through the *Canalis nasalis* right down into the Nose, and that even with its largest End foremost, marked *b*, in Fig. 12. I have even several Times opened the nasal Canal readily in this Species of the Disorder, by the Probe marked K, in Tab. I. For deterging the Ulcer, and compleating the Cure, you must follow the Methods we have before proposed: Only instead of a Tent of Lint, you should use one of Lead or Wax, and touch the *Canalis nasalis* every other Day cautiously with a conical Bit of *Lapis infernalis*; and, after healing up the external Lips of the Wound, use the Injections adapted to keep open the nasal Canal for a considerable Time. M. PETIT has sometimes successfully used a thick waxed Thread, to keep open the nasal Canal, instead of a Tent, as we are informed by M. GARENGEOT, in his Chapter on this Disorder. But when you find the *Os Unguis* foul or vitiated, you must enlarge the Opening of your Ulcer, and remove the Caries, or perforate the Bone, as we before proposed.

Treatment
of complete
or open Fis-
tule.

XIX. In those lacrymal *Fistulae*, which have no Obstruction of the nasal Canals, instead of probing, you must more frequently wash out the offending Sordes by Injection. The best Injections in this Case are of the Decoctions of vulnerary Herbs, all mineral or medicated Waters; or *Aqua Calcis*. When you perceive the lacrymal Sack too much relaxed or distended, you must endeavour to recover its Tone by topical Remedies, as *Hungary Water*, &c. And the Lips of the Wound must be touched frequently with the *Lapis infernalis*; by which the relaxed Skin will be greatly strengthened: You should also apply the compressing Instrument represented in Tab. XVI. Fig. 20. or some other figured for the same Purpose by AQUAPENDENS, SCULTETUS, or PALFYN.

Fistulae
without Ob-
struction of
the nasal
Canal.

XX. But it must not be imagined, that the Method of probing and injecting, contrived by ANELIUS, will cure all lacrymal *Fistulae* whatever. For in such as are inveterate, and attended with an obdurate Callus, or a spreading Caries, this Practice will be to no Purpose. Nor are we as yet furnished with Remedies sufficient for the Cure of such *Fistulae*; though I can acquaint you, that *Archiat. BRUNNERUS* assures me in a Letter, that he cured a lacrymal *Fistula* of the very worst Kind by a mercurial Injection. It very often happens too, that the Flux of purulent Matter in this Disorder cannot be lessened, nor the nasal Canal kept open by Injection, so as to make a Passage into the Nose, even though it may seem pervious to the Probe: Of which I have known various Instances, without being able to account for the Cause. In these Cases, therefore, if the Patient presses for a Cure, there remains but one Method of relieving him, and that is, by removing the Callus and Caries, and by making a new Passage, or an artificial nasal Canal into the Nose. See N° XII and XIII. preceding. Sometimes the Caries penetrates so far into the *Os spongiosa* of the Nose, that it is impossible for you to extirpate the same either by Remedies or the Cautey: Though I must confess this to be a Case that never occurred in my own Practice. But even in the very worst Cases, the Disorder may by pal-

Callous and
caries Fis-
tulae.

liated, and the Patient much relieved, by making a Passage for the purulent Matter, to run into the Nose, which before discharged itself with great Uneasiness at the Corner of his Eye: And in these Cases too you will find Injections of the greatest Service.

Other new
Methods of
Cure.

XXI. We before observed, that, in imperfect *Fistula*, where the Skin is not eroded, you ought first to make an Incision through the Integuments before you perforate the *Os unguis*. But, to render the Operation less formidable and severe, a certain Surgeon of *Hamburg* thought it best to perforate the Skin, Sacculus, and Bone at once, with an Instrument contrived for that Purpose, represented in *Tab. XVI. Fig. 24.* keeping open the new-formed lacrymal Ducts by a Tent, till the Wound was healed externally. Lastly, as some of the Moderns have found, that the new nasal Canal formed by perforating the *Os unguis*, does frequently fill up, or grow together, they have endeavoured to prevent it (by *WOOLHOUSE's* Direction) by inserting a small Tube of Lead, Silver, or Gold, *Tab. XVI. Fig. 25.* which is left there ever after, and the external Wound healed up over it, that the Passage may not afterwards close up. In this Practice I have several Times succeeded myself: But then I used a Tube a little larger than the common, as at *Fig. 26.* that the Tears might have a free Passage; healing up the Wound afterwards over the Tube.

LEMORIERE's
Method.

XXII. We have still another new Method of curing lacrymal *Fistula*, proposed to the Royal Academy at *Paris*, by M. LEMORIERE^a. He first opens the lacrymal Sack in the usual Manner by a Scalpel, and then inserts a particular Kind of sharp-pointed and crooked Forceps, *Tab. XVI. Fig. 29.* A, with the Beak of which he breaks through the *Os lacrymale* into the Cavity of the Nose. In the next Place, he dilates the Perforation with the Forceps, *Fig. 30.* with which he further lacerates and breaks the *Os lacrymale*, and Membrane of the Nose, to enlarge the Ducts, so that it may not easily close up again, which it is otherwise very apt to do. After removing the Forceps, he dresses the Wound for the first Days with Lint, and some digestive Ointment: But, on the third or fourth Day, he introduces a Bit of Wax-Candle into the new-formed Duct instead of a Tent, which should be about the Thickness of a Straw, or one Line at least in Diameter, made a little crooked, and armed with a small Head, as at *Fig. 31.* A, B. This he continues in the Duct for the Space of thirty or forty Days, till the Parts are well formed; after which he removes the Candle, and heals the Wound: By which Method, he asserts, the Duct may be certainly kept open without any Danger of Concretions.

M. ST.
YVES's Method.

XXIII. We have also another Method of curing these *Fistulae*, given us by the famous Oculist ST. YVES of *Paris*, and described by SCHOBINGERUS, in a Treatise *De Fistula lacrymali Basil. Ann. 1730.* as follows: First, he gently elevates and stretches the Skin at the greater Canthus of the Eye, as in opening a Vein, and then makes an oblique Incision with a Lancet, through the Integuments, and lacrymal Sack from the Eye-lids towards the Tendon of their orbicular Muscles^b: He next dilates the Wound by inserting a Tent of prepared Sponge, and defends it with a Piece of Plaster. The next Day, after removing the Dressings,

^a In *Memoir. Acad. Reg. An. 1729.* pag. 590. Edit. *Amstel.*

^b I suppose the Incisions must be made from below upward: But it does not appear from this Description.

he examines the State of the Wound and *Os unguis* with a Probe, and by Injection; and is particularly careful in his Enquiry, whether the Bone be carious. This done, he supports the Patient's Head in a reclined Posture with one Hand, while, with the other, he cautiously and obliquely perforates the *Os unguis* towards the Nose with a triangular Probe, by the *French* called *Troicar*: In doing of which, great Care must be taken not to mistake the *Os planum* for the *Os unguis*, lest, by perforating the first, you should run into the *Antrum Highmorianum*, or else upon the *Apophysis nasalis* of the *Os maxillare*. Add to this, that when the Apex of the Trocar has entered obliquely through the *Os unguis*, you must then direct it betwixt the two *Laminae* of the *Os spongiosum* in the Middle of the Nose, that you may avoid injuring those *Laminae*, or any of the adjacent Parts. The Perforation thus made, the Surgeon now directs the Patient to breathe deep, and blow out the Air forcibly through his Nose; that by the Exit of the Air and Blood through the Wound, he may judge whether the Perforation be rightly made. To dilate and keep the Passage open, he at first inserts a Bit of Wood like a Wedge, and covers it with a Bit of Plaster. But for the same Purpose, he afterwards dresses with Tents of Lint dipt in Cerate, which Tents he renews every third Day, gradually enlarging them, but never exceeding the Thickness of a Goose-quill; and afterwards he gradually diminishes the Thickness of the Tents before the Wound is quite healed^a: By which means he asserts, that the foul Bones will cast off and separate spontaneously, without the Help either of actual or potential Caustery, and a new Passage will be formed for the Tears from the lacrymal Sack to the Nose. If any Splinters or Asperities of Bones offer themselves in the Cure, they must be removed, Sinuosities must be opened, and Ulcerations in the *Membrana Schneideriana* and lacrymal Sack deterged with *Lap. infernalis*, or other Escharotics. At every Dressing the Patient must close his Nostrils, and endeavour to force the Air through the new-formed Duct, to discharge the Sordes, and clear the Passage, which must be afterwards filled with a Tent dipt in Oil^b, and covered with a Plaster: And when the Sides of this artificial *Canalis nasalis* appear consolidated, the Tent is omitted, and the Plaster only used till the external Wound is also cicatrised, which, he says, will generally be within the Space of six or eight Weeks. And, lastly, towards the End of the Cure, when the Parts are near cicatrised, you may inject some proper Liquor through the *Punctum lacrymale*, which, by passing into the Nose, will demonstrate whether you have rightly succeeded.

XXIV. With regard to the Method of curing lacrymal *Fistulae* by Probing and Injecting, proposed by ANELIUS, SCHOBINGERUS, in pag. 22. of his Dissertation on this Subject, writes, that it is almost universally rejected, or forgot, because it requires an uncommon Dexterity or Slight in the Administration thereof. I grant, indeed, it may be rejected, or forgot, by those who are ignorant of the *Encheiresis* of the Operation, and Anatomy of the Parts. But, for my own Part, it is my general Practice, and I find no Difficulty in it: Though one would imagine, from the Description SCHOBINGERUS gives of it, that he could scarce at all perform it, not being sufficiently versed in its *Encheiresis*.

An Observation on the Method of ANELIUS.

^a I question whether it be absolutely necessary to observe all these Circumstances minutely.

^b 'Tis the general Advice of Surgeons, never to apply Oil or Fat to injured Bones: And, as I can see no Reason why it should be applied to these tender ones, I think it is safer to use a Tent dipt in *Sp. Vini rect.* or some Tincture, rather than Oil.

Some Errors
of M. GARENGEOT.

XXV. It is also remarkable, that M. GARENGEOT, in his *Operations*, passes by this Method of ANELIUS with little or no Mention of it, as a Thing of no Consequence: And, in his Treatise of *Instructions*, he describes it so lamely, that one may be satisfied he never attempted or performed it. The Probe, too, which he figures for this Operation, is so slender and weak, and so ill-shaped towards its upper End, that one can never be able to open the nasal Canal by it. He likewise represents the End of the Tube for the Syringe so slender, that it must be impossible for it to have any Perforation or Cavity as it ought; besides which, it will be apt, like a Needle to run into the Eye-lid itself instead of the Duct. Lastly, he directs to use a *Speculum Oculi*, instead of the Fingers, to secure the Eye-lids in this Operation, which *Speculum* he figures double, so that the Operator will be more obstructed than assisted by the Instrument: When the whole Business may be performed with the greatest Ease by the Fingers only, according to the Directions given by myself, and ANELIUS, for above these twenty Years past, and as I have above an hundred Times performed it. In the next Place, M. GARENGEOT writes, that the lacrymal Probe cannot be conducted into the nasal Canal, because ("*le Detour est trop grand*") of the great Incurvation of the Passage to it; whereas the Probe may be thus conducted without Difficulty by one versed in the Artifice, and acquainted with the Course of the Ducts. And so far is the Thing from being almost impossible, as he asserts it to be, that I readily performed it above twenty Years ago, barely after the Reading of ANELIUS's Account of it, without seeing it done by another. I must indeed own, that several Surgeons have, at Times, applied themselves from *Hamburg*, and other remote Parts, to me at *Helmstadt*, to instruct them in the *Encheiresis* of this Operation, which they before thought impracticable, because they had several Times miscarried in it: But, after they had been shewn the Artifice a few Times by me, they found no Difficulty in performing it themselves. I had once a Student in Divinity under my Care for a lacrymal Fistula, who, after having seen me pass the Probe every Day for some Time through the *Punctum lacrymale* and nasal Canal into his Nose, could, upon trying, easily perform the same himself by looking in a Glass; and became, at length, so expert in it, as to pass it with more Nimbleness and Dexterity than I could myself: For by that Time you would imagine the Probe entering the lacrymal Punctum and Duct, he had slipt it also instantly through the lacrymal Sack and nasal Canal into his Nose; which Process he would repeat several Times in an Hour, without any Difficulty or Uneasiness, and there leave the Probe, to keep the Passage open. I have been the more prolix on this Artifice, to refute the Impossibility of it, and demonstrate M. GARENGEOT not only unskilled in the Operation, but even ignorant of the chief Use of the Probes which he represents, when he says, they serve only to search out the lacrymal Sack: Whereas the chief Design of them is to open the obstructed Cavity of the nasal Canal, in the watery Eye and lacrymal Fistula. Nor does the aforesaid Gentleman so much as mention the Name of ANELIUS, the Inventor of these lacrymal Probes and Syringe; for what Reason I must leave others to judge. Consult MORGAGNI, in *Adversar. Anatom.* VI. 64.

XXVI. Nor must I omit mentioning here a Method of PETIT's; which is this: He makes an Incision in the lacrymal Sack; into which he introduces a grooved Probe, passes it into the Nose, and, by this Means, opens the Canal.

Through

Through the Groove in the Probe he admits a Wax-candle (Fr. *Bougie*) to keep the Duct open. This Candle he changes once a Day, till he thinks the internal Surface of the Canal is perfectly cicatrised; and he uses it no longer. The Tears now pass, as usual, from the Eyes into the Nose, and the external Wound is closed in two or three Days. But I know by Experience, that this Method does not always succeed.

XXVII. From what has been said in this Chapter, it will manifestly appear that there are various Methods of treating lacrymal *Fistulae*, according to different Authors, and the several Species of the Disorder: Infomuch that there is not any one Operation in Surgery besides, in which Surgeons are less uniform or more unsettled in their Practice. You will find this Disorder considered more largely, with many other different, but less considerable Methods of treating it, in our professed Dissertation *De Fistula lacrymali*, *Altorf*. 1716.

Authors divided as to the Treatment of these *Fistulae*.

XXVIII. It now remains for me to acquaint the Reader briefly with the Methods in which I myself usually treat these *Fistulae*. And first, in the Beginning of the milder Species, I approve of the Method of Probing and Injecting, contrived by ANELIUS: Which I usually continue for the Space of several Days or Weeks, according to the Nature of the Disorder, and especially when I perceive it diminish by this Practice. But when I find little Benefit result from it, I have Recourse to the Knife, with which I carefully lay open the Skin and lacrymal Sack, by an oblique or semi-lunar Incision; then waiting till the Hæmorrhage ceases, the next Day I perforate the *Os unguis* into the Nose, by the Instrument for this Purpose in *Tab. XVI. Fig. 24.* or *Tab. XXIV. Fig. 2.* In performing which, I observe the several necessary Circumstances, as I have before directed. After washing the Wound with warm Wine, I first fill the new-formed Duct with a Tent, and a Day or two after with a Piece of Wax-candle, or a Leaden Plummit, about the Thickness of the Instrument at *Fig. 21. A.* dipped in some Balsam or some mineral Water, till the Canal is completely formed; to effect which the sooner, I now and then touch the Surface with a Stick of *Lap. infernal.* after the Tent or Candle is extracted: And in this Method I continue three or four Weeks, or longer. I next insert a small Canula of Lead, Silver, or Gold, *Tab. XVI. Fig. 25.* from PLATNERUS, and heal up the Wound over it: But as the Bore of that Canula often proves too small to transmit the viscid Juices of these Parts freely into the Nose, I generally prefer one that is a little larger, as at *Fig. 26.* which I insert, and heal up the Wound over it as before. The Tube thus left in the new-formed nasal Canal, is generally so far from being uneasy to the Patient, that I have known many, who could not tell whether the Tube was left in or not, after their Cure was completed. But to prevent any Obstructions, or other Accidents, towards the End of the Cure, the Day after I have closed the Lips of the Wound, I inject some *Decoct. Veronica* (or some mineral Water) several times every Day through the *Puncta lacrymalia* by the Syringe of ANELIUS, that the Tears may have a clear Passage to the Tube. I must indeed confess, that though these Tubes will generally very well suffice to convey the Humours into the Nose, yet, in some malignant *Fistulae*, when the Tubes are not large, they do not answer their Intention, but leave the Patient molested with a watery Eye. I never yet used the actual Caustery for the Cure of these *Fistulae*, and I really think it is hardly ever necessary, notwithstanding many Authors lay so great a Stress upon it. But on the

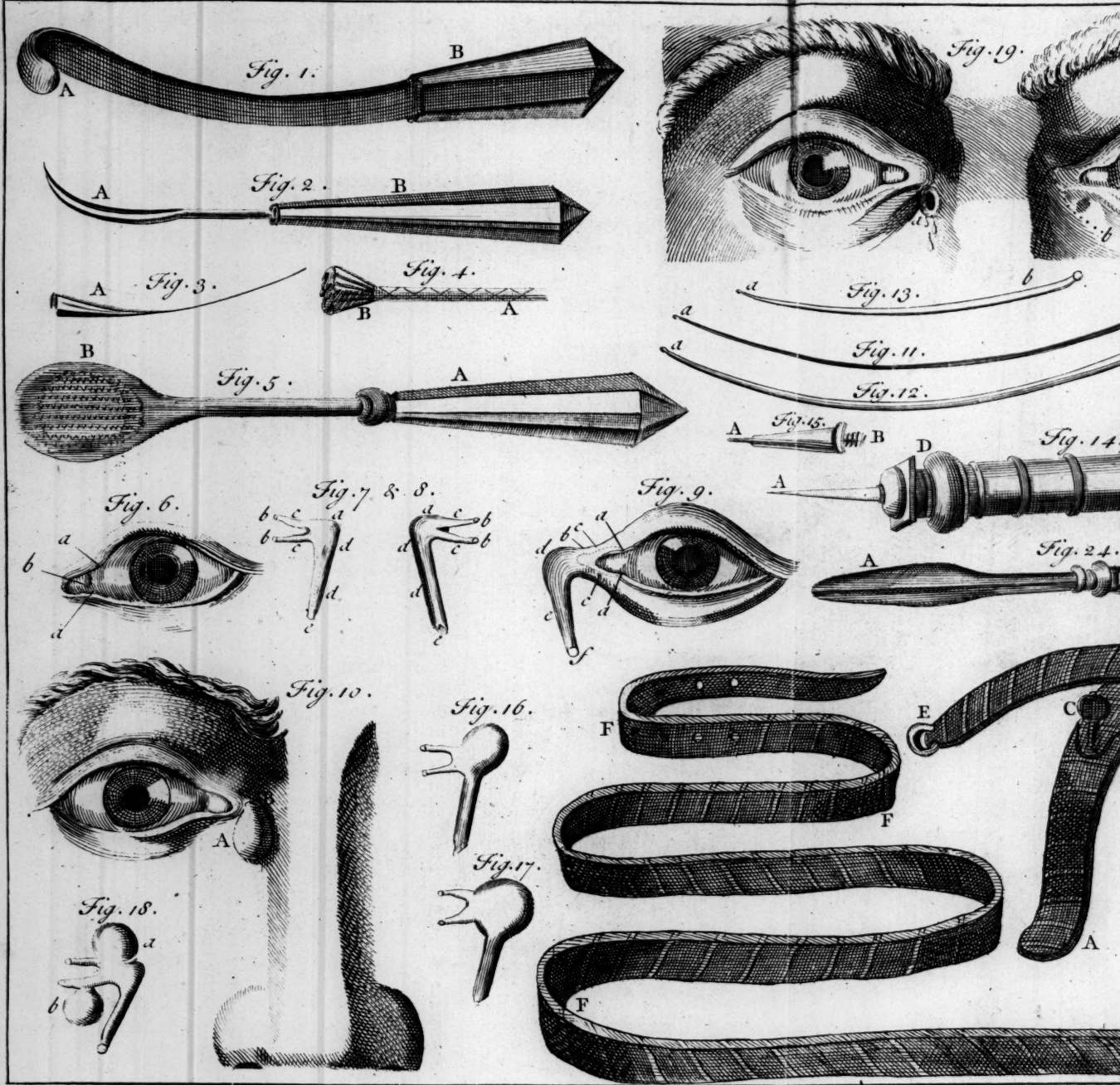
The Author's Method of treating lacrymal *Fistulae*.

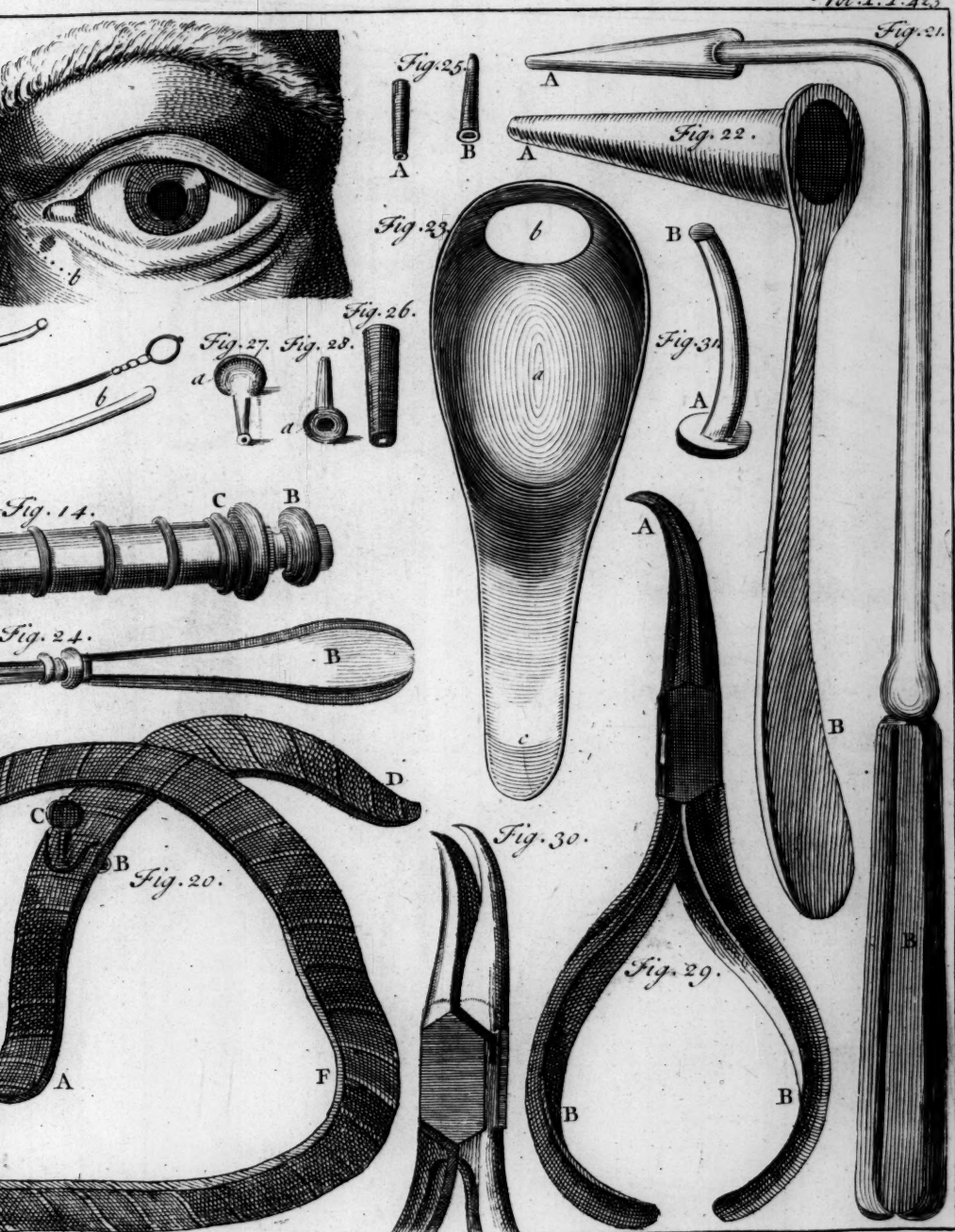
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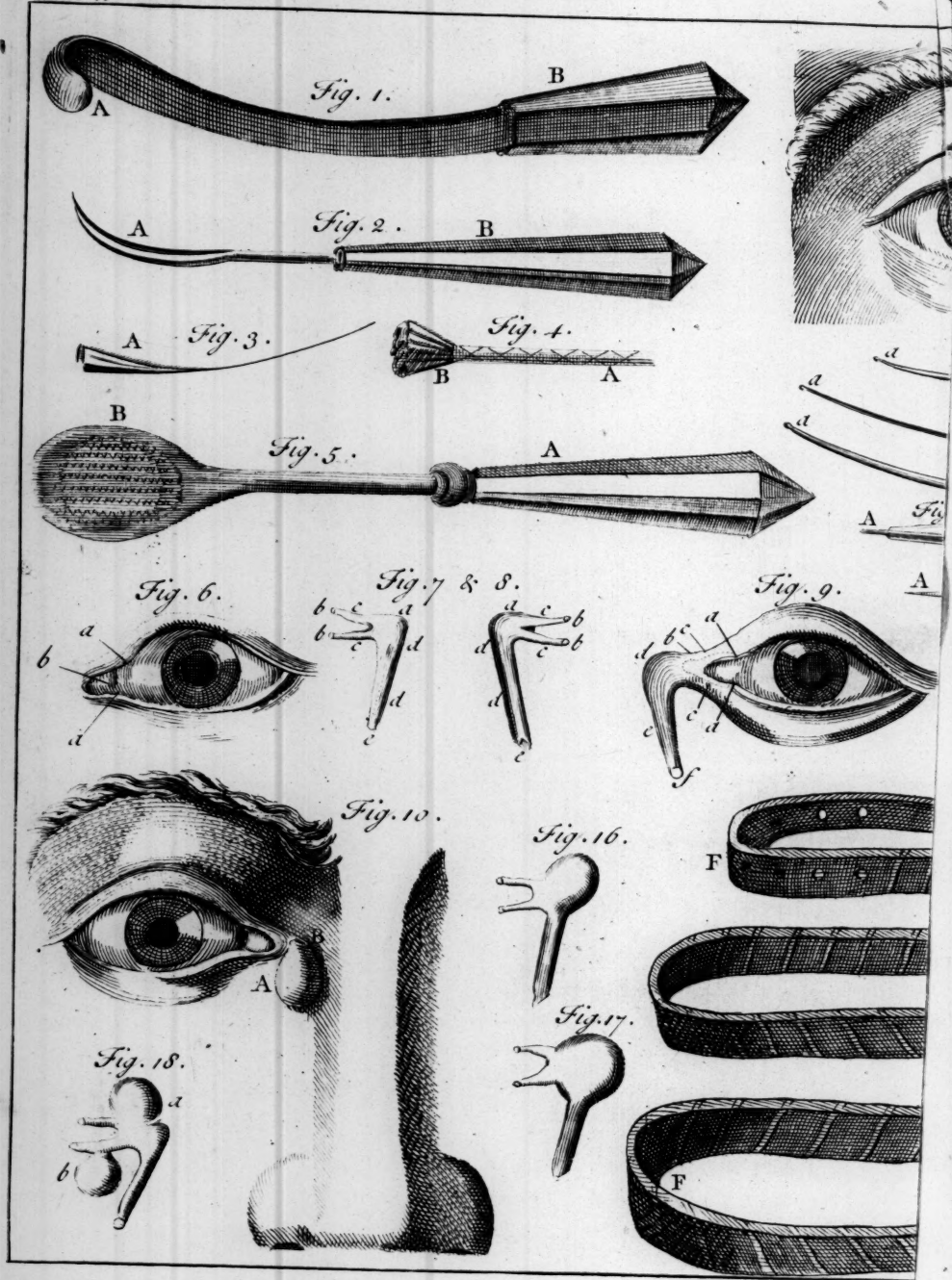
contray, I imagine the Basis of the Cure to consist in making an artificial nasal Canal sufficiently large, by the Method here prescribed; so that it may not easily be again closed or obstructed. Even if you meet with a Caries in the *Os unguis*, it may be very well removed without the actual Cautery. And lastly, you may from hence conclude, those perforating Instruments and *Canule*, which are too small to make an ample Passage through the *Os unguis* into the Nose, not well adapted to succeed in this Operation.

Cautions.

XXIX. I think it will not be improper to close this Chapter, by giving the young Surgeon a few Cautions with regard to our present Subject. And first, it will be necessary for him to keep the Patient's Body open with lenient Purges, especially when he is to call in the Assistance of the Knife; not neglecting to open a Vein in plethoric Subjects, and to repeat it upon the Approach of inflammatory Symptoms after the Operation. 2. In Patients of an ill Habit, afflicted with these *Fistulae*, the Juices must be corrected by the Use of alternate and evacuating Medicines before and after the Operation, especially a Decoction of the Woods, and a mercurial Purge now and then. (3.) If the lacrymal *Fistula* be attended with some other Disorder, a Regard must be had to treat the latter with proper Medicines separately. (4.) With regard to the Surgeon's Posture for performing this Operation, I usually do it standing: But PLATNERUS performs it sitting, almost in the Manner of couching a Cataract. *Diff. de Fist. lacrym.* pag. 41. (5.) The same Author directs (pag. 43.) to remove the *Periosteum* from the Bone in this Operation, also to divide and extirpate the lacrymal Sack by a transverse Incision, after separating it from the *Os unguis*. But as I can see no Reason for this Practice, I never came into it, and yet I cured my Patients equally well: And therefore of two Evils, the least is to be chosen. (6.) In order to cure the *Hernia* of the lacrymal Sack, PLATNERUS advises to open it with the Scalpel, and afterwards to heal it with *Bals. de Mecha*, that the Sack may be contracted, and rendered firmer by the Cicatrix. I myself have succeeded in this Practice: But then, a few Days after the Incision, I touched the Lips of the Wound every Day with *Lapis infernalis*, and injected afterwards a Decoction of *Veronica cum pauxillo Sp. Vini*. (7.) In a Caries of the *Os unguis*, PLATNERUS advises not to perforate it, but to burn it through into the Nose by the actual Cautery, according to the antient Practice. But as this severe Practice is not attended with any Advantage, and as the Caries of the Bone may be removed by perforating it without Fire, I prefer the milder Method. (8.) In cutting these *Fistulae*, M. GARENGEOT advises to divide the *obliquus inferior* Muscle of the Eye, if it appears bare of its Fat: But as he gives no Reason for this Practice, which may be followed with dangerous Consequences to the Eye, I think it ought to be rejected. (9.) The same Author asserts, that the new Perforation into the Nose cannot be kept open, and that therefore the Tears will not have a Passage thither after the Operation: Also, that the *Puncta lacrymalia* will be useless after the Operation. But, if this be compared with what has been here advanced, and tried by the Experience of myself and others, the Reader must naturally conclude that Gentleman to be but little versed in Disorders of the Eyes, which is also proved from his not mentioning what has been proposed on this Subject by ST. YVES, WOOLHOUSE, and LEMORIERE.







An EXPLANATION of the SIXTEENTH PLATE.

- Fig. 1.* Represents an obtuse pointed Hook, to draw the Eye-lids asunder in some Operations: It was sent me under the *French Name Hameçon plat*, or the flat Hook. A is the flat End; B the Handle.
- Fig. 2.* Represents the Needle A, fixed in a Handle B, for elevating and dissecting the small Blood-vessels on the *Conjunctiva* and White of the Eye; as also to elevate and dissect a *Pterygium*.
- Fig. 3.* Denotes a Beard of Rye or Barley, to make the Brush or Scarificator: In which A denotes the small Hooks and Points which scarify the Blood-vessels of the Eye.
- Fig. 4.* Is an Eye-brush composed of twelve or fifteen of the foregoing Beards: A the Handle; B the Part which scarifies.
- Fig. 5.* Is the Eye-rasp of CELSUS and AEGINETA, made in Shape almost like a Spoon: A the Handle; B the rough and convex Part, with which the Antients scarified the Eye-lids. This I received from M. MAUCHART. We have another a little different from this represented by PLATNERUS, in *Dissert. de Scarif. Oculor.*
- Fig. 6.* Represents the Left Eye: Whose two *Puncta lacrymalia* are denoted by *a a*, and the lacrymal Caruncle betwixt them is marked *b*.
- Fig. 7 and 8.* Exhibit a View of the lacrymal Ducts, as they pass from each Eye into the Nose: *a a* the lacrymal Sack; *b b* the *Puncta lacrymalia*; *c c* the Ducts which lead from the two *Puncta* into the Sack; *d d* the nasal Canal; *e e* the Opening of the same Canal into the Nose.
- Fig. 9.* Shews the Manner in which the before-described Ducts are situated and disposed with regard to the Eye: *a a* the *Puncta lacrymalia*; *b* the lacrymal Caruncle; *c c* the Ducts which lead from the *Puncta* to the lacrymal Sack: *d* the said Sacculus; *e* the *Canalis nasalis*; *f* the Aperture of it into the Nose.
- Fig. 10.* Shews an *Anchylops*, and a *Hernia* or Distension of the lacrymal Sack.
- Fig. 11.* Is a very slender Probe of Silver Wire, a little crooked, and armed with a small Head or round Point, for opening and clearing the lacrymal Ducts and nasal Canal, when they are obstructed in *Fistulae*, or a watery Eye, as proposed by ANELIUS.
- Fig. 12.* Is another Probe of the same Kind, and for the same Use, but stronger; which I use in more obdurate Obstructions of these Parts.
- Fig. 13.* Is another Kind of Probe, which I now use for the same Intentions, but more conveniently, as it is shorter.
- Fig. 14.* Is a small Silver Syringe, as described by ANELIUS, to inject Liquors through the *Puncta lacrymalia*: A the Tube which enters the lacrymal *Punctum* and Duct; B the Handle of the Sucker; C, D, the hollow Cylinder.
- Fig. 15.* Is another small Tube of a different Make, which may be adapted to the End of the Syringe by the Screw B.
- Fig. 16 and 17.* Demonstrate the several Ways in which the lacrymal Sack may be distended or relaxed.

Fig. 18.

Explanation of the SIXTEENTH PLATE. Part II.

Fig. 18. Shews how an Abscess or Tubercle may be formed, so as to destroy the lacrymal Duct; *a* that upon the upper Duct, *b* one upon the lower Duct, like that which I saw in the Duke of SAVOY.

Fig. 19. Represents a complete lacrymal Fistula: *a* one with a pretty large Opening; *b* one with a narrow Opening; the Line *b c* denotes the Course for Incision in these *Fistulae*.

Fig. 20. Is a Steel Instrument for compressing the lacrymal Sack, from PLATNERUS: A the Bolster which is imposed on the lacrymal Sack; B the Hinge; C the Screw which presses the Bolster on the Sack; D the upper Part which goes over the Forehead; E a Hook which goes into the Holes of the Strop, to secure the whole upon the Head.

Fig. 21. Is an Iron Cautery, for perforating the *Os lacrymale*.

Fig. 22. A Canula adapted to the preceding Cautery, to be fixed upon the Bone before the Cautery is applied.

Fig. 23. Represents an Instrument made of Silver or Brass: Which in the Part marked *a* is made hollow like a Spoon, to cover and secure the Eye, while the Cautery is passed through the Aperture *b* to the carious Bone; *c* the Part which serves for a Handle. This may also serve to cover the Eye when you cut for the *Fistula lacrymalis*.

Fig. 24. Represents an Instrument for perforating the Integuments, lacrymal Sack, and Bone, at the same time; or you may only perforate the Bone with it, after the lacrymal Sack is opened by Incision. A the Point; B the Handle.

Fig. 25. A B denote small Tubes to be inserted into the Perforation of the *Os unguis*, according to WOOLHOUSE and PLATNERUS, and to heal up the Wound over it.

Fig. 26. Is a Tube of the same Kind, but a little larger; which I use for the same Purpose, and may be best made of Lead or Gold.

Fig. 27, 28. Are Silver Tubes used by PLATNERUS, to keep open the new-made Passage to the Nose, till it is become callous or cicatrised.

Fig. 29. Represents the Forceps of LEMORIERE: A the sharp-pointed and crooked Beak, which perforates the *Os unguis*; B B its Handles, by which you open and shut its Beak.

Fig. 30. Represents the Head only of the same Forceps, opened as it is when you dilate the Parts, after perforating the *Os lacrymale*.

Fig. 31. Denotes the Shape of the Piece of Wax-candle, which LEMORIERE uses instead of a Tent, to keep open the Perforation to the Nose: A its Head; B that End which goes into the Nose.

Of OPERATIONS on the EYES.

C H A P. LVI.

Of SUFFUSIONS or CATARACTS.

I. **A**FTER having considered the Disorders of the Parts adjacent, we come now to those of the Eye itself: The chief of which is that termed a *Suffusion* by the Antients, and a *Cataract* by the Moderns. The *Greeks* call it *Hypochyma* and *Hypochysis*; the Description of which Disorder has been very imperfect, till of late. We describe a Cataract or Suffusion, with the generality of Oculists, to be a Disorder of the Humours in the Eye; by which the *Pupilla*, which ought to appear transparent and black, looks opaque, and of some other Colour, as inclining to white, grey, blue, brown, &c. And thus Vision is variously impeded, or totally destroyed.

A Cataract described.

II. It is remarkable that the generality, and even the most eminent Surgeons and Physicians, have been all along greatly deceived, till within the present Century, both as to the Seat and Causes of the Cataract. Most of them believed it to be a Pellicle, or membranous Substance, formed always in the aqueous Humour. Whereas the most expert Surgeons and Oculists have of late Years found, that, by repeated Dissections of the Eye thus disordered, there is hardly ever any white Membrane or other foreign Substance to be found in the aqueous Humour; but that it is almost constantly an Opacity in the crystalline Lens; and therefore the true and common Cause of a Cataract is, according to myself and the rest of the Moderns, an Opacity of the Crystalline, and not any thing in the aqueous Humour, as the Antients supposed. Indeed the Antients might have been led into this Error very easily, from the Appearance which the Disorder affords, without dissecting the Eye: For, by barely inspecting that diseased Organ, the opaque Crystalline looks like a Membrane in the aqueous Humour; by couching or depressing which, with a proper Instrument, the Eye recovers its former Vision. This is confirmed by various Observations and Experiments made by several eminent Members of the Royal Society at *London* and *Paris*, and the *Commerc. Literar. Norimberg.*; and may be seen, considered more at large, in our professed Treatise *De Cataracta*,

Causes according to the Antients.

* M. GARENGEOT here is much to be commended; that is, his Treatise of *Chirurg. Instruments*, Tom. I. Cap. XIV. p. 414. He laments and inveighs against the Negligence of Surgeons in leaving the Operations on the Eye wholly to Mountebanks and Strollers: And exhorts them earnestly to vindicate this most noble Branch of Surgery to themselves (though at present few are furnished even with proper Instruments) and to bestow due Pains and Attention upon it. Yet I cannot but wonder, that amongst all his *Chirurgical Operations*, this very Gentleman should describe in his Writings, or point out to his Pupils, but one relating to the Eye: Which is the Operation performed in the *Fistula lacrymalis*. This confirms me in what I hinted in the foregoing Chapter, that he was not very conversant in the Cure of these Disorders.

Glaucomate, & Amaurosi, An. 1713. and in our Apology for, and our Vindication of, the same, *An. 1717 and 1719^a.*

The first Discoveries of the true Cause.

III. It is almost eighty Years since the preceding Error of the Antients, with regard to the Cause of Cataracts, began to be publickly remarked by M. QUARE, ROLFINCKIUS, GASSENDUS, RAUHAULT, BORELLI, and others. But these Gentlemen having but few Observations to establish their truer Notion of the Disorder, their Observations were not only thought, by the generality, to be anomalous, but even the old Error, of Cataracts being constantly formed by a Membrane, still prevailed; and the rather, because there were few or none who took the Pains to dissect any Eyes affected with this Disease. But at length M. BRISAC and MAITRE-JEAN, by new Experiments and Dissections of Eyes thus affected, demonstrated apparently, that Cataracts arose not from any Membrane, but an Opacity of the crystalline Lens^b. But though these last Gentlemen were much mistaken, in thinking themselves the first Proposers of this Discovery; yet their Merit is not inconsiderable, for having more carefully proved, and demonstrated by incontestable Observations and Experiments, what had been started by their Predecessors, and at that Time almost buried again in Oblivion. For, to say nothing of myself, the whole Drift of the Essays and Observations on this Subject, given us by the Learned in *France, England, and Italy*, tends largely to prove, that the ordinary and *most common Cause* of Cataracts is from an Opacity of the crystalline Lens.

The Author's Opinion.

IV. I say only the most common Cause of Cataracts is from an Opacity of the Crystalline; without absolutely denying, as some do^c, that a membranous Substance may be sometimes formed in the Eye, so as to cause the like Disorder. I rather recommend this Point to be decided by further Observation and Experiments. For though when I first wrote on the Cataract I was furnished with five Observations of my own, besides those of BRISAC and MAITRE-JEAN, in which an Opacity of the Crystalline appeared to be the sole Cause; yet I even then entertained an Opinion, and afterwards declared it, that I thought a Membrane, or other solid Body, floating in the aqueous Humour, might sometimes also cause a Cataract, as I once observed in dissecting a recent Subject. Nor has this Caution of mine turned out useless to others, since I received a Letter from Professor WIDEMANNUS, Director of the *Acad. Natur. Curios.* which assures me, he found and demonstrated such a Membrane to several eminent Physicians of *Norimberg*, as LOCHNER, THOMAS, and GOCKELIUS, in both the Eyes of a Woman who had Cataracts: But then he at the same time observed in one Part of the Crystalline an incipient, and in the other Part a complete Opacity. After the Operation, which was performed three Years before the Woman died, she became quite blind of that Eye whose Crystalline was wholly opaque; and with the other Eye, whose Crystalline began to be obscured, she could only discern and distinguish large Objects. A Case much like this LANCISI tells

^a PLATNER, a Pupil and Friend of WOOLHOUSE (in *Program. Anatom.* 1736. relates, that in the Eye of a Female Patient who had a Cataract) he found no Pellicle or membranous Substance; but the Crystalline Lens was opaque, and less than usual. So that even WOOLHOUSE's Pupils agree with me, that this Disorder is not properly called a *Glaucoma*, but a *Suffusion*.

^b This is the Opinion received and defended by the present *English Oculist*, TAYLOR, in his Pamphlet on the Cataract, *Lond. An. 1736.*

^c Among these I am reckoned as one by TAYLOR, in *Page 5.* of his said Pamphlet; but unjustly, since my Writings on the Subject demonstrate the contrary.

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me he observed in GARELLI, *Archiater* to the Emperor, upon dissecting whose Eyes he found a whitish Membrane in each, floating in the aqueous Humours: But then here again the CrySTALLINES were yellowish and something obscure, though his Eyes had never undergone any Operation while he lived. Thus these Membranes seem generally attended with a Disorder of the CrySTALLINE. From these and a few of the like Observations, it appears, that a Cataract may sometimes be caused by a Membrane in the aqueous Humour, though generally and most frequently from an Opacity of the crystalline Lens.

V. Though an Opacity of the crystalline Lens appears, from Observation and Experiment, to be the common and most frequent Cause of Cataracts; yet it has been denied by several^a, many of which have no other Reason to offer, than that they think it very extraordinary, and almost impossible, that so many eminent Physicians, and professed Oculists, should have been thus mistaken, for so many Ages, in judging it to proceed from a Membrane. Others think the Method of curing this Disorder, by couching or depressing the crystalline Lens, is so severe and dangerous an Operation, that it must inevitably destroy the whole Sight of the Eye, because they judge the CrySTALLINE to be absolutely necessary for Vision. But how egregiously these are mistaken, may appear from the single Instance of the expert Anatomist WENCKERUS: Who found both the CrySTALLINES at the Bottom of the Eyes many Years after he had couched; the Patient, in the mean time, enjoying his Sight very well, especially with one Eye, even to his Death, when they were dissected. A like Observation we have, given us by BENEVOLI, first separately, *Florent. Anno 1722*, and afterwards joined to a Treatise *De Caruncula in Urethra*: To which add the several Experiments made by the *French*, mentioned long ago in my Treatise on the Cataract. There are some again who, being fond of cavilling about Words, contend that such an Opacity of the CrySTALLINE ought rather to be called a *Glaucoma* than a Cataract; but with no more Reason on their Side than the former. This Disorder of the crystalline Lens affords the same diagnostic Symptoms, and is cured by the same Practice with what has all along obtained among the Antients in their Suffusion or Cataract: And therefore this Disorder really is, or at least deserves the Name of their Cataract. On the contrary, we find that a *Glaucoma* is all along described by the most expert Surgeons and Physicians, as a Disease which very seldom happens, and which is wholly incurable. There are other frivolous Objections started, which the Reader may see refuted more at large in our Treatise on the Subject, with the Apology for the Vindication of it. We therefore assert, that a Cataract is hardly ever caused by any Membrane, or other Body floating in the aqueous Humour: Because it appears from Experience, that out of fifteen Patients, you shall hardly find one Cataract caused by a Membrane, all the rest proceeding from an Opacity in the crystalline Lens. And consequently we may depend on what has been advanced by the most expert Sur-

Asserters of
membranous
Cataracts
refuted.

^a We have a Dissertation *De Cataracta*, published in 1721, at *Strasburg*, by FREYTAGIUS; in which he asserts the general Cause of Cataracts to be a Membrane in the aqueous Humour; but, instead of proving it anatomically, he would persuade us, he had seen his Father extract such Membranes with a Hook above an hundred Times: But few will believe him, who know any thing of the Disorder, and what has been advanced concerning it by others.

geons in France^a, England^b, and Italy^c, viz. that the common Cause of Cataracts is not any Membrane, but an Opacity of the Cryſtalline, notwithstanding what others may ſay to the contrary.

Diagnofis.

VI. From what has been ſaid, it will be no difficult Matter to diſtinguiſh a Cataract from the reſt of the Diſorders of the ſame Organ. For, 1. it differs from an Amauroſis, or *Gutta Seneca*, which ſome call the black Cataract: Be- cauſe in this laſt the Eye loſes the Sight without any viſible Diſorder in the Eye, or any Change in the Appearance of its Pupilla. 2. An *Albugo*, or white Speck in the Eye, is not behind the Cornea and Uvea, as is the Cataract, but in the Cornea itſelf. 3. The *Ungula*, or *Pterygium*, is a preternatural Tunic without-side the Cornea. 4. The *Hypopium* is indeed ſeated behind the Cornea in the aqueous Humour; but then it conſiſts of a purulent and fluctuating Matter: Whereas the Cataract is a ſolid Subſtance. 5. A *Glaucoma* does indeed appear in a great meaſure like a Cataract, ſo as to deceive many, if they do not conſider that though both of them are ſeated behind the Pupilla, yet the *Glaucoma* being in the vitreous Humour, lies deeper than the Cataract, whoſe Seat is in the Cryſtalline: Therefore the firſt will generally appear of a darker blue, or a grey Colour, as its Name imports: Whereas the Cataract uſually appears of a Pearl Colour, and ſeated immediately behind the Pupilla: Add to this, that it has been conſtantly obſerved by Phyſicians, that the *Glaucoma* very rarely happens in Compariſon with the Cataract: And when once it is formed, there is no Poſſibility of removing it, which cannot be ſaid of the opaque Cryſtalline.

Species of Cataracts.

VII. Cataracts have been diſtinguiſhed by Surgeons and Oculiſts into various Species. As, 1. By the Time of their ſtanding, into *recent* and *inveterate*. 2. By their Growth, into *incipient* and *confirmed*. 3. Into *mature*, when the Pupilla is totally obſtructed; and *immature*, when the Pupilla being but partly obſcured, the Patient is as yet capable of perceiving Objects. Some Cataracts never come to Maturity, or at leaſt but very ſlowly. 4. According to the Symptoms, Cataracts are again diſtinguiſhed into *ſimple* and *complicated*: The latter being when the Cornea, Uvea, or vitreous Humour are alſo affected, or when the Pupilla is immoveable, too much contracted, or adheres to the adjacent Parts. Sometimes there is a *Tabes* of the Eye attending it; and at other Times it is joined with ſome Diſorder of the Retina, or optic Nerve. 5. Cataracts are generally immoveable, but ſometimes they tremble or fluctuate upon touching the Eye with the Finger, being then called a *ſhaking Cataract*. 6. Almoſt all of them are of different Shades, though they approach nearly to the ſame Colour, to wit, that of Pearl, whitish, or grey, and are accordingly denominated *white* or *grey Cataracts*. We do not frequently meet with Cataracts of a yellow or greenish Colour, and ſeldom with any marbled, or looking like Cheeſe, or like a glowing Iron. 7. In ſome Cataracts the cryſtalline Lens degenerates into a milky Fluid, and in others into a purulent Matter, like that of Abſceſſes: And in couching theſe, the Matter will eſcape, and conſuſe the Humours of the Eye upon breaking the Capſule of the Cryſtalline with the Needle. And hence again we have a Diſtinction of Cataracts into *milky* and

^a M. PETIT and MORAND, in *Hiſt. Acad. Reg. An.* 1722, 1723. and ST. YVES of Paris, in his Book on *Diseases of the Eyes*, Chap. on the Cataract.

^b Mr. CHESELDEN, and others, in *Phil. Tranſact.*

^c AS MORGAGNI, SANTORINI, COCCHUS, BENEVOLUS, &c.

purulent.

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purulent. 8. Cataracts are again usually distinguished by Oculists into *true* and *spurious*: By the first, we mean one in which the Opacity appears immediately behind the Pupilla; but the *spurious* is, when the Opacity seems to be seated otherwise. Lastly, 9. Cataracts are not undeservedly distinguished into curable and incurable: For those of a grey or whitish Colour are the most easily cured. To these we may add such as have no Colour, the Patient being sensible of Light and Darknes: Also those, in which the Pupil does not adhere, but can contract and dilate itself: On the contrary, you can have no great Hopes of curing complicated or fluctuating Cataracts, in which the Patient can neither perceive Light nor Darknes, and in which the Pupilla or Uvea adheres, is immoveable, and either contracted or dilated; or when it appears of the unusual Colours at 6. and 7. preceding. We find some again distinguishing Cataracts into *common* and *uncommon*. By the first, they intend such Opacities of the Crystalline as appear of a whitish Colour; and by the last, they mean those of any other Colour: Which indeed differ very remarkably from the former, in appearing not convex, like them, but flat or convave, as we have lately observed some, and as I find it also remarked by the accurate Oculist M. ST. YVES, in his Treatise on the Diseases of this Organ.

VIII. We before demonstrated, that the common and usual Cause of Cataracts is an Opacity of the crystalline Lens, and hardly ever a loose Membrane. But to explain the Manner in which the Crystalline becomes thus obscured, we must consider, that when the Juices are too thick and glutinous to pass freely through the very minute serous Vessels of this Body, they stagnate and obstruct those Vessels, which become afterwards contracted and dried. Thus it may be formed, in various inflammatory Disorders of the Head and Eyes; and particularly after some external Violence has injured that Organ, as a Fall, Blow, Burn, &c. or exposing the Eyes too much to the Heat of the Summer Sun, or an intense Fire.

IX. The principal Sign of a Cataract is, therefore, a small Cloud, or whitish Opacity of the Crystalline. To satisfy your Patient whether it may be cured by couching, you ought to be first well assured, whether it be of the mature or immature Kind: For if it be of the latter, the Operation will be absolutely mischievous. The Signs of a *mature* Cataract, fit for couching, are, when the Pupil having lost its native Blackness appears moveable, and equally of a dusky Hue, the Patient being sensible of Light and Darknes, but incapable of distinguishing Colours. On the contrary, you may judge it to be *immature*, if the Opacity is not equally spread behind the Pupil, the Patient being as yet able to see Objects imperfectly, especially upon turning his Back to the Light. But, if the Patient can neither discern Light nor Darknes, it is a Sign the Retina or optic Nerve is greatly affected, and that the Disorder is an *Amaurosis*, or *Gutta Serena*, for which no Cure can well be expected. You may also discover whether the Pupil adheres to the Cataract, and is become rigid, by observing whether it contracts or dilates itself in a strong Light, or in the Dark; also if it does not move upon rubbing or touching the Eye with your Finger. If any small Specks appear behind the Pupil, some Parts of the Crystalline are either inspissated, or else some minute Pellicles are sprouting from the Uvea, as I remember to have seen, and which may possibly unite into a Membrane. Sometimes only the Middle, the Margin, or else one half of the Crystalline is become opaque; and in

in the first Case, Objects will seem to the Patient to be perforated in the Middle. If any Tunic appears plain or convex within-side the Pupil, it denotes the Surface of the Cataract, as ST. YVES observes.

Prognosis.

X. There is scarce any Disorder, the Event of which is more uncertain than that of the Cataract: Which will sometimes admit of a Cure, and sometimes not. But, to say the Truth, Medicines will generally have little or no Effect, when the Disorder is confirmed or inveterate; notwithstanding what some may boast of their wonderful *Arcana* for this Purpose^a. Almost the sole Relief is therefore to be had from the Surgeon's Hands and Instruments. We very rarely meet with Instances of this Disorder being cured by leaving it to Nature alone. And yet, by the Operation itself, a Cataract that bids fairest for Recovery, though treated in the most judicious Method, shall frequently be the worse for it; when one that seemed to be irrecoverable, shall be cured by the same Treatment, beyond all Expectation. However, a Cataract is much milder and more tolerable to the Patient than many other Disorders which we esteem desperate and incurable: Because neither the Disease nor the Operation are usually accompanied with intense Pain, nor Hazard to the Patient's Life. But, in the general, those Cataracts are most likely to be cured, which are mature and not complicated, the Patient being capable of distinguishing Light and Darkness, and the Pupil retaining its natural and free Motion. But there can be little Hopes of succeeding in those where the Pupil is rigidly contracted, the Uvea firmly attached to the Cataract; or where the Pupil, having lost its natural round Figure, is lacerated, angular, and variously distorted. The Success of the Operation is rendered still more doubtful, if the Patient is weak, aged, or afflicted with a violent Head-ach, or when the Eye is too much shrunk up, or enlarged and swelled. The Cataract is also the worse, as it degenerates more from the Pearl Colour: For the most unusual Colours always proceed from and denote the worst Affections of the Eyes. Yet even many of these are often cured by the Operation beyond Expectation, when the Eye is free from other Disorders. For the milky and purulent Cataracts, though there is Danger of the opaque Matter mixing with the aqueous Humour in the Operation, so as to render the Success of it doubtful; yet it has been often observed by the most expert Oculists, that this Matter will subside to the Bottom of the Eye, and the Humours recover their former Clearness^b. It is indeed difficult to couch a variegated or marbled Cataract, as being too soft, and not yet arrived to a due Consistence. Therefore when this Species does not give Way to Remedies, you ought to defer the Operation till the whole Pupil appears opaque, which denotes the Cataract to be sufficiently mature. The Disorder has been judged the more difficult to cure, as it is more inveterate, by the antient Surgeons and Physicians: and yet it has been observed by some of the modern Oculists, that Cataracts, without other Disorders in the Eyes, may be often cured, though of twelve, eighteen, or even thirty Years standing, if the Eye is free from other Disorders. If the Patient cannot distinguish Light and Darkness, the Opera-

^a HOVIUS audaciously asserts (*in Lib. De circulari Humor. in Oculis Motu*, pag. 122.) that he can thus, at any Time, cure all Sorts of Cataracts, whether recent or inveterate. But, upon the strictest Enquiry into the Truth of the Matter, I can meet with no Instances of his Success.

^b See my Treatise on the Cataract, p. 255. See MAITRE-JEAN, *Lib. De Morb. Oculor. Cap. De Cataracta*.

tion will be but of little more Service than for removing the Deformity of the Eye: Because then the Cataract is accompanied with an *Amaurosis*, or *Gutta Serena*. In Infants the Operation is generally less safe, and more impracticable, than in Adults, by reason of their Impatience and Strugglings. Nor should the Operation be performed on those who have a Cough, Catarrh, Defluxions, and Vomiting, before those Disorders are first removed: Lest, by the Patient's being disturbed in the Operation by those Symptoms, his Eye might be irrecoverably injured and spoiled for the future. In those Cataracts which move or fluctuate from one Side to the other, there is generally little or no Hope of the Operation succeeding: But when the opaque Body appears before the Pupil, it may then be sometimes extracted through an Incision in the Cornea.

XI. When the Cataract appears even desperate or incurable, I think it is better to attempt to restore the Patient's Sight by the Operation, though in vain, rather than leave him to certain Blindness without using the best Means: And this the rather, because the Operation may be performed, without inducing intense Pains, or endangering the Patient's Life; which are indeed Reasons sufficient to deter most People from Lithotomy, and the more severe chirurgical Operations. When the Patient is blinded by the Cataract, he cannot be blinded again by the Operation, if it does not succeed. The less Prospect there is of curing the Disorder, the more Honour and Fame will the Operator acquire, by recovering the Patient's Sight beyond all Expectation.

XII. Surgery can be of little or no Service towards the curing of a *Gutta Serena*, as hath been hitherto universally allowed: Till of late, the *English* Oculist TAYLOR has given out, that he can cure it by an Operation. The Falsity of this, Experience has demonstrated. The Disorder we now speak of, is not seated in the anterior or middle Part of the Eye, but either in the Retina, the optic Nerve, or in the Brain itself, to which Parts no Operation can be extended. If there is any Room left to expect a Cure, it will be more reasonable to attempt it by such internal Medicines as will raise a Salivation, and purge; adding at the same time Phlebotomy, Scarification, and Setons or Issues, especially those on the coronal Suture, or in the Neck. What we have said of the *Amaurosis*, or *Gutta Serena*, holds true in a worse Degree of the *Glaucoma*: Which being an Opacity of the vitreous Humour, is universally allowed, both by the antient and modern Surgeons, to be incurable by any Operation whatever. It is remarkable, that this vitreous Humour is sometimes so much indurated, as well as discoloured, that it resembles a Cartilage; as appears from an Observation formerly communicated to me by the celebrated Anatomist and *Archiater* LANCISI.

XIII. There are chiefly two Methods of curing Cataracts: Either by couching with the Needle, or by the Use of internal and external Remedies. It is true, there are some who reject all Methods of treating Cataracts by Medicines as useless and trifling: Yet I think there are some Cases in this Disorder which ought to be recommended to the Care of the Physician. Nor are there Instances wanting, as well among the Moderns as Antients*, of Patients, who, by the Help of Nature, assisted with Medicines, have been freed from Cataracts beyond all Expectation; especially when the Disorder is incipient, and not firmly rooted or fixed in the crystalline Lens. But leaving the Physician to direct a

* Vide CELSUS Lib. VI. Cap. 6. and the modern Writers on the Disorder.

proper

proper Regimen and Course of Physic adapted to the Patient's Habit, Age, and other Circumstances, we shall here proceed immediately to describe the Methods of curing Cataracts chirurgically, by the Help of the Hands and convenient Instruments; of which CELIUS has treated with great Accuracy.

Surgeons advised to be diligent in learning this Operation.

XIV. But first it may be proper for us to admonish Surgeons to make themselves better acquainted with the Operation for couching Cataracts, and to be more conversant in the Practice thereof, and not to leave the Business to Quacks and itinerant Pretenders, as we have seen it done but too much of late^a. If the Practice is, as we see often, well enough executed by these boasting Pretenders, what might we not expect from the Hands of the more prudent and regular Surgeon, were he to engage more in this Practice: Which is, in reality, attended with less Danger or Hazard than the common Operation of Phlebotomy. For, in couching a Cataract, you run no Risque of wounding a Nerve, Tendon, or Artery, as you do in opening a Vein. But lest our Reader should think we are recommending the Operation, for its easiness, to the Practice of every one, though ever so unskilful; we shall here enumerate the several necessary Qualifications for an Oculist, whom we may venture to trust in the Cure of this Disorder. 1. He must be very well versed in the anatomical Structure, and in the Functions of the several constituent Parts of the Eye, that he may avoid injuring any of them ignorantly. 2. He must be well acquainted with the best Instruments and Methods of operating, to be learned from a frequent and close Attention to the Practice of some expert Master. 3. His Mind must be intrepid, his Hand steady, and his Eye sharp and quick-sighted. 4. He should be equally ready with his Left as with his Right Hand; that he may couch the left Eye with his Right Hand, and the right Eye with his Left Hand. 5. He must have made himself previously expert in the Practice, by repeated Trials upon the Eyes of Brutes, and of dead Men, before he ventures to couch the Eyes of the Living.

The Time of Couching; and previous Preparation of the Patient.

XV. But, in order to the more successful and easy Performance of this Operation, it will be previously necessary for the Surgeon to appoint the most convenient Time, and to prepare his Patient in the best Manner, by a proper Regimen and Medicines. With regard to the first, such a Season should be chose, in which the Air is pretty temperate as to Heat and Cold, as in Spring and Autumn. The Day appointed for the Operation should especially be serene and clear, and the Hour generally in the Fournoon: Not but the Afternoon will do very well, and may be, in some Cases, preferable for weak and timorous Patients, who are usually in better Spirits after a moderate Dinner. The Apartment for couching the Patient in will be fitter as it is lighter, provided the Sun does not shine in upon you: For so strong a Light as the Sun's Rays will cause the Pupil to contract itself, so that you cannot have so large a View of the Parts and Instrument within the Eye. As for the Preparation of the Patient, he should not only observe a proper Regimen and Diet a few Days before the Operation, but he should also in that Time take some alterative and evacuating Medicines, with the Use of Phlebotomy, to prevent the Eye from being molested by intense Pain, Inflammation, Suppuration, and perhaps a Loss of the

^a It is a little extraordinary, that M. GARENGEOT should take no Notice of this Operation in his Treatise, as if it made no Part of Surgery.

whole,

whole, after the Operation has been performed^a. It may also be generally convenient to give the Patient a Clyster, if he has not eased himself lately. And, that his Courage may not fail him, the Operator should take Care that he may have some Gravy-Soop, or other strengthening Suppings in the Morning, before he begins his Operation. Lastly, nothing can more conduce to the Patient's Recovery, and the Prevention of Accidents, after the Operation, than to procure him a sound Sleep afterwards by an Anodyne Draught or Emulsion; by which the Faculties both of his Body and Mind will be recruited, and the lately suppressed Cataract will not be apt to ascend again.

XVI. The Surgeon ought never to undertake the Operation by himself, but to provide two Assistants; one to hold the Patient's Head (as in *Tab. XVII. Fig. 1. A.*) and the other, to administer the Needle and other Necessaries. But he must be more particularly provided with *couching Needles*, and with a *Speculum Oculi*. Of the *Speculum* you have two Forms at *Fig. 15* and *16.* and of the couching Needles there are a great many Kinds, the chief of which are represented in *Tab. XVII. Fig. 2, 3, 4, 5, 6, 7, 8, 9, 10* and *11.* The best of them are, in my Judgment, those at *Fig. 5, 6,* and *10.* All have a little broad and sharp Point like a Tongue or like a Barley-corn, but flatter: And that at *Fig. 6.* with a Sulcus in its Point, seems better adapted to couch the Cataract, than any of those which have either a narrower or a broader Point. For those with too slender a Point, as in *Fig. 2* and *4.* do easily lacerate the Cataract: And those with a more obtuse Point, as in *Fig. 8.* meet with Difficulty in perforating the Coats of the Eye. For these Reasons many Surgeons use two Needles in this Operation, one with a sharp Point, (*Fig. 7* and *9.*) to perforate the Coats of the Eye, and the other with a broader or more obtuse Point (*Fig. 8.*) to depress or couch the opaque crystalline Lens. But it is much easier to write of the Advantage of using two Needles, than to experience it in Practice. But which ever Sort you chuse, Care must be taken, that it be first well polished with Cloth or Leather, before you use it to the Eye; that neither its Roughness, nor any Particles of Rust, may injure that very tender Organ. Mr. FREYTAGE beforementioned greatly recommends a Needle shaped like a Hook, for extracting membranous Cataracts out of the Eye: But if this succeeds so well, why did he not give us the Figure of it?

Of the Assistants and Needles.

XVII. That there may be no Obstruction, nor any Time lost in the Operation, it will be necessary to provide every thing in Order which may be wanted for the Dressings, after the Couching is performed. Such as, 1. a cooling Collyrium *ex Aq. Plantag. cum Ovi alb. subact. & cum Aluminis, vel Tutie, vel Croci, aut Camphoræ portuncula.* Others use common *Sp. Vini* for a Collyrium. ST. YVES uses a Mixture of ten Parts Water, and one *Sp. Vini*, which he recommends as the best. 2. A large Compress of soft Linen, sufficient to cover the diseased Eye. 3. A Bandage of about three Ells long, and two Fingers broad, or else an Handkerchief folded together in Form of a Triangle, to retain the Compress and Dressings on the Eye. Lastly, 4. you must provide some *Aq. Reg. Hungar. vel Acetum, vel Sp. Cl. &c.* to rub the Patient's Nostrils, if he should faint in, or soon after the Operation.

Apparatus of Dressings described.

^a Such a Case as this is described by my Son, in his Account of the Operation for a Cataract, performed by TAYLOR at Amsterdam, in 1735, upon one of our Friends.

Position of
the Patient.

XVIII. There now remains but one more Pre-requisite before the Surgeon enters on his Work: And that is, to fix and secure the Patient in the most convenient and advantageous Posture. He therefore must be placed against the Light on a much lower Seat than that of the Operator, as you may see in *Tab. XVII. Fig. 1. E.* the Surgeon himself C, being seated on a much higher Chair D. If the Patient can see either perfectly, or but in Part with the Eye, which is not couched, it must be first covered or blindfolded with a Handkerchief or Bandage; lest, by seeing the Instrument approach, he should move his Eye, and disturb the Operation. Upon which Account it may be also proper to admonish the Patient, that if his Eye should recover its Sight very suddenly in the Operation, as is not unfrequent, he may not stir, or make any Exclamations of Joy till it is over: Lest, by a small irregular Motion, the whole Cure should be frustrated, and his Sight lost for ever. The Patient should fix his Hands on the Surgeon's Thighs, and his Legs also betwixt those of the Operator. Sometimes it may be proper for an Assistant to hold up his Feet, that he may not rise out of the Chair before the Operation is finished. Behind the Patient must stand the Assistant A, securing the Head, when the left Eye is to be couched, with his Left Hand on the Forehead, and his Right Hand upon the Chin, which he must press close to his Breast, so as to hold the Head firm and steady; because a very small Motion of the Head may cause perpetual Blindness, as we are assured by sad Experience.

Method of
Operating.

XIX. Every thing being thus prepared in Readiness, the Patient is ordered to open his Eye-lids as wide as possible, and to turn his Eye inwards towards his Nose, that a sufficient Portion of the White of the Eye may appear in the lesser Angle of the Orbit towards the Temple. (See *Plate XVII. Fig. 14. A.*) The Operator now divaricates the Eye-lids with the Fore-finger and Thumb of his left Hand, when it is the left Eye, and of his Right Hand when it is the right Eye he couches: And thus he at the same time firmly secures the Eye from moving: See *Fig. 1.* and *Fig. 14.* Some there are who use the *Speculum Oculi*, *Fig. 15* or *16*, for this Purpose, which, in my Opinion, will more impede than assist the Operator: But I shall not advise those to reject it, who are fond of using it. The Oculist next takes the couching Needle, handed to him by an Assistant, betwixt the Thumb, Fore and Middle-finger of his Right Hand, in the Manner we usually hold a Pen in Writing, as you may see in *Fig. 1.* and *Fig. 14.* He then places the two lower Fingers of the same Hand upon the Patient's Cheek, to support those which guide the Needle, and that they move freely, as in Writing. Then he carefully enters the Needle almost in the Middle of the White of the Eye^a betwixt the *Cornea* and external Angle of the Orbit; proceeding, not obliquely, but straight, through the Coats of the Eye, over-against the Cataract, to avoid wounding the Blood-vessels; see *Fig. 14. A.* As soon as the Needle is perceived to be through the Coats of the Eye, which may be known by your losing the Resistance, its Point is then inclined towards the Cataract; (see *Fig. 14. B.*) which being entered by the End of your Instrument, you thereby endeavour to depress it gently below the Pupil to the Fundus of

^a The true Place for perforating the Coats of the Eye by the couching Needle, has been largely and elegantly treated of in *Mem. Acad. Reg. Paris. An. 1726*, pag. 370. Edit. *Amstel.* by M. PESTI, who assigns the Place to be two Lines Distance from the *Cornea*. The Place approved of by TAYLOR we shall consider hereafter.

the Eye, whether it be a Membrane or an Opacity in the crystalline Lens: For we are not as yet furnished with distinguishing Marks sufficient to know one Case from the other by their external Appearance, except the Observations of ST. YVES. If you perceive the Cataract descend with the Point of the Instrument below the Pupilla, which it will do the first Time, when mature and consistent enough, you are then to continue it there a little while, that it may afterwards stay at the Fundus of the Eye. If, upon elevating your Instrument again, the Cataract does not rise above the Pupil, your Operation is well performed: And therefore the Needle is now to be drawn out of the Eye in a straight Line as it entered. If the Cataract rises again afterwards above the Pupil, as it frequently does, you must again couch it with the same Needle, as before, keep it down a longer Time, till it remains suppressed below the Pupil. M. FREYTAG indeed advises to extract the Cataract, which he thinks is always a Pellicle, by a Hook through the *Cornea*: As, he says, he has frequently seen done by his Father. But as he neither describes the Hook, nor the Method of Extraction, and as I much doubt whether this Hook would not also extract or lacerate the *Retina*, *Choroides* and *Sclerotica*, 'tis, in my Opinion, best to neglect his Advice.

XX. When the Cataract adheres firmly to any of the Coats of the Eye, 'tis often a very difficult Task to couch or depress it entire: And therefore in this Case you may first divide it with the Needle, and then couch or depress each Part separately. The same must be done if you happen to lacerate, or break the Cataract in Pieces in the Operation: And, by this means, the Patient has often recovered his Sight, as we read in CELSUS, GUILLEMEAU, PAREY, BARBET, BRISSAC, and as I have twice observed myself. If the Cataract adheres so firmly to the Uvea, that it can hardly be thence separated, it is often convenient to perforate it in the Middle: By which Means the Rays of Light, passing through the Perforation to the *Retina*, the Patient can sometimes see tolerably well afterwards. Which Practice may perhaps succeed best when the Crystalline is very thin: For I once found it so diminished in Thickness in a dead Subject, that it was scarce thicker than one's Thumb-nail, and firmly adhered at the same Time to the Uvea. But when the Cataract appears to be yet too soft, it is adviseable with BRISSAC, to withdraw the Needle, and defer the Operation till it becomes more consistent, rather than destroy the Patient's Sight by confusing the Humours. When both Eyes are to be couched, 'tis best not to perform the Operation on both at one Time, but to intermit a few Days, that the Patient may the better endure the same without too violent Symptoms. If you couch the right Eye, the Operation must be reversed: That is, you must hold open the Eye-lids with the Thumb and Fingers of your Right Hand, and couch the Cataract by the Needle with those of your Left; because the Vicinity of the Nose to the greater Canthus of the right Eye, will impede the Action of the right Hand for this Operation. Though in *Tab. XVII. Fig. 17.* you have the Figure of a Needle contrived and sent me by a Friend, with which you may couch the right Eye with the Right Hand. A the Needle, B the Handle, C the Incurvation which rests on the Nose.

XXI. It is a common Practice with Mountebanks and itinerant Oculists, to hold up their two Fingers extended, or else a Glass of Wine, before the Patient's Eye, as soon as the couching Needle is extracted; calling out to know

Reflections
on the Operation.

Treatment
after the Operation.

what the Object is, or of what Colour it appears : And if the Patient can distinguish, and answer rightly, they then conclude the Operation to have been well performed. But this is, by the more prudent Surgeons and Oculists, judged to be a pernicious Method ; because, by the Patient's straining his Eye too soon to view the Objects, the Cataract is often roused and elevated again. It is therefore much better to defend the Eye immediately after Couching with a Compress dipt in some Collyrium, and secured by a Handkerchief, that the *Retina* may not be injured by a too strong Action of the Light. It will be necessary to blind up both the Eyes, though you couched but one : Because if you leave the sound Eye uncovered, it will be perhaps looking at Objects, and will consequently draw or strain the diseased Eye in the same Direction ; which may remove the Cataract, and cause it to ascend again, or else induce an Inflammation, or other bad Accidents.

How to prevent the Cataract from rising.

XXII. After your Dressing and Deligation, the Patient should be laid on his Bed, upon his Back, with his Head elevated, and retained almost erect, by Pillows ; and continue very quiet and composed for the Space of eight Days, without coughing, sneezing, laughing, intense talking, or eating Food of a hard Digestion, in order to prevent the Cataract from rising or being disturbed. No Surgeon can assert that the Cataract shall continue suppressed after the first Time of couching : But the Patient has this Advantage, that if it ascends it may be again suppressed, and his Sight recovered by the Operation. Accordingly MAITRE-JEAN writes, that a Patient, whom he couched in Autumn, had a Return of his Cataract in the Spring following. But it was happily removed again by repeating the Operation. We have even some Instances of the Cataracts having subsided again of themselves, after they had risen above the Pupil.

Further Treatment.

XXIII. A few Hours after the Operation, it will be convenient to bleed the Patient in Proportion to his Strength and Fulness of Habit, to prevent an Inflammation in the wounded Eye ; and to repeat the same, if necessary, with the Use of *Collyria* externally, and cooling Purges internally. 'Tis very remarkable, that the Patient is often troubled with a Vomiting an Hour or two after the Operation, as I have frequently observed, and imagine to arise from the Consent of the Nerves, and their Irritation in the Operation, which soon goes off afterwards : Which I find has been also observed by Mr. FREYTAG. However, this Symptom of Vomiting is no good Presage, because the Patient's straining in this Action, often causes the Cataract to ascend. In the Evening, after the Operation, you should order the Patient an anodyne Emulsion, to compose him to Rest ; because Watchings and Restlessness very often occasion the Cataract to ascend again above the Pupil. The Diet and Regimen here must be ordered the same as we have directed in Wounds and inflammatory Disorders. Lastly, if the Patient does not go to Stool freely without straining, it will be proper to help him with a Clyster : Nor should he be permitted to disturb his Head by rising out of Bed for this Office ; but, for the first few Days after the Operation, it will be more convenient to use a Bed-pan. All which Precautions are necessary, to prevent the lately depressed Cataract from being disturbed or raised again above the Pupil.

XXIV. With regard to the Deligation and subsequent Dressings, it will be convenient to remove the Bandage very gently on the first Evening after the Operation ;

Operation; and renewing the Compress dipt in some Collyrium, to apply the Bandage again as before. On the following Days this Process must be repeated Morning and Evening at least, and sometimes four or five Times in a Day: Because the Inflammation then becomes more intense, and the Compresses dry much sooner. Therefore the Operator should, at this Time, be more solicitous to guard the Light from the Eye, especially when the Inflammation runs high. If the Eye continues in a good Condition with but a slight Inflammation, you must continue this Method of Dressing till the eighth Day, when all the Danger will be over: You may then, by Degrees, remove the Bandage, and admit the Light to the Eye, which should be for some Time guarded at first with a Piece of green Silk hanging over the Forehead. On the tenth Day, if nothing forbids, the Patient may rise and walk about his Chamber, provided his Window-curtains are drawn, and his Eyes defended with green Silk as before: Which he may, by Degrees, lay aside, and return to his former Course of Life.

XXV. That the young Surgeon may the better understand how to relieve the several Accidents which may attend this Operation, we shall consider each of them separately. And, 1. If a small Portion of Blood should be extravasated, and escape into the aqueous Humour, so as to render it in some Measure obscure and turbid, you must dispatch the Operation as fast as possible, and dress up the Eye with a Compress dipt in the forementioned Collyrium: By which Means slight Extravasations have been frequently observed to be dispersed. But if a large Quantity of Blood mixed with the aqueous Humour, it will then be almost impossible to avoid a Suppuration, termed *Hypopyum*, or other ill Consequences, which endanger perpetual Blindness, or a total Destruction of the Eye. Yet even here you will find great Benefit from plentiful Bleeding, and from discutient Bags stuffed with Fennel, Sage, Hyssop, and Rosemary, boiled in Wine, frequently to be applied warm to the Eye. 2. If the aqueous Humour itself escapes, or runs out of the Eye, in the Operation, so as to leave the *Cornea* flaccid, the Eye itself is not in any great Danger thereby: For the Humour will be reproduced so as to fill the *Cornea* again in a few Days. Lastly, 3. If great Inflammation should arise, you must omit nothing that will conduce to suppress it: As plentiful Bleeding, and drinking of Water, or other cooling and diluent Liquors, to bathe the Temples frequently with *Sp. Vini Camph.* to apply Blisters behind the Ears, and clyster the Patient as you shall see necessary.

XXVI. From what has been said, I think it is sufficiently apparent how much the Moderns are improved above the Antients, as to their Knowledge of the true Nature or Diagnosis, Prognosis, and Method of curing this Disorder. For, upon observing that a Cataract was rather constantly formed by an Opacity of the Crystalline, than from any Membrane, BRISSAC consequently judged, that those couching Needles would succeed best, which were made with a sulcated and pretty broad Point, as in *Tab. XVII. Fig. 6. lit. C.* For by using those slender-pointed Needles of the antient Surgeons, whether made of Gold, Silver, or Steel, it was almost impossible to avoid cutting or lacerating the Cataract in couching it. But the couching Needle of BRISSAC is made with an acuminate, as well as a broad and sulcated Point, that it might the more readily perforate the Coats of the Eye. The Handle of the couching Needle

The Removal of Accidents.

Fabric of the couching Needle.

Needle A B is octangular; and the Side marked E E lying even with the Sulcus in its Point, is hatched, or otherwise particularly marked, that you may judge by the Position of the Handle how the Point of the Needle is directed, in respect of the Cataract in the Eye. Lastly, the rising or Protuberance of the Instrument, marked D, serves to indicate how deep it has entered into the Eye.

Other particular Needles.

XXVII. Those Surgeons who have persuaded themselves, that a Cataract proceeds from a Membrane or Tunic, have also provided themselves with an unciform Instrument, to extract the said Membrane through the Puncture made in the Coats of the Eye by the Needle, and prevent the Disorder from returning; as it might, if they were to leave the Cataract at the Bottom of the Eye. Some of their Instruments were made tubular, in order to suck out the Membrane from the Eye^a; others were made like a Pair of small Pliers in the Shape of a Needle; as in *Tab. XVII. Fig. 10.* and others again were like small Hooks which they introduced and extracted through a Canula, together with the Tunic or Cataract, according to FREYTAG. But their Methods and Instruments were as useless and mischievous as their Notion of the Disorder was false.

When the Cataract comes thro' the Pupil.

XXVIII. We have further to advise, that if the Cataract should further extend itself, or slip through the Pupil, as it sometimes may, it will then be proper to try if you can draw it back by passing the Needle through the Pupil; if not, to make a small Incision in the lower Part of the *Cornea*, and thereby extract the Cataract by a small Hook or Probe; an Instance of which Practice we have given in our professed Treatise on this Disorder.

TAYLOR'S Method.

XXIX. The noted Oculist, TAYLOR, proposes a new Method of his own, as he says, for couching Cataracts, in the ninth Chapter of his Treatise, which he describes as follows: The Patient being seated as usual, and his Eye held firm by the *Speculum Oculi*, he then makes a small longitudinal Incision with a Lancet^b of about half a Line in Length below the usual Place; which Incision he continues through the external and internal Coats of the Eye into the vitreous Humour. He then takes a *Plano-convex* Needle of a very slender or thin make, and passes it through the Incision directly into the Eye, with its convex Part upwards and towards the Bottom of the crystalline Lens. He next gently elevates the Point of his Needle a little, till he finds a small Resistance on it from the crystalline Lens above it, which he also perceives to move, by looking through the Pupil. Being thus assured the Point of his Needle is under the Capsule of the Crystalline, he then guides his Needle downward towards the Bottom of the Eye, to divide the vitreous Humour, and make a Space for receiving the Crystalline, which he next depresses. In order to couch the Crystalline, after having divided the vitreous Humour, he draws his Needle about two Lines further out of the Eye, and then inserts the Point of it into the lower Part of the Capsule of the Crystalline, which he thus incises or opens as he says, without injuring the *Ligamentum ciliare*: And in thus opening the Capsule, he also endeavours to enlarge the Space for receiving the Crystalline. Lastly, in order to couch or depress the opaque Crystalline, he again extracts his Needle almost three

^a Vid. SCHACCHI *Subsid. Medicin.* p. 54. & TH. FIENI, *Lib. Chirurg.* p. 30.

^b He does not give us any Reason for using a Lancet, or for making his Incision longitudinal rather than oblique or transverse, nor can I see any Reason for it; but it is a standing Maxim in Surgery, never to use several Instruments for what may be done as well by one.

Lines more out of the Eye: Then elevating its Point, and fixing the same into the upper Part of the Cryſtalline, he endeavours to depress and lodge it in the Space before made for its Reception in the vitreous Humour at the Fundus of the Eye, and then gently extracts his Needle. By this means, he asserts, that the *Uvea* and *Ligamentum ciliare* are not in the least injured, but remain in their natural and sound State: Whereas in the common Method of couching they are usually lacerated, to the great Detriment of the Eye, and its Office of Vision. To conclude, the Substance of his Method of operating, which we have here briefly related, is so swelled and obscured, by stuffing it with frivolous Cautions and Circumstances, in his Treatise, from whence we have extracted it; that it there takes up more than three Times the Compass in which we have here represented it: And yet we have omitted nothing but what was either insignificant or unintelligible. There are even so many Circumstances related, that it seems impossible the Author himself should attend to all of them; and this may possibly be one Reason of his ill Success in Practice, his Operation being followed with excruciating Pains, most violent Inflammation, and a Suppuration of the Eye, instead of recovering the Patient's Sight: As you may see related more at large in my Son's Treatise, on the unhappy couching of a Cataract in our Friend at *Amsterdam*, by TAYLOR, in 1735. However, the Practice deserves to be considered and tried by the more prudent Oculists: And the Success of it will, in Time, determine the Author's Merit.

XXX. When the Cataract moves, or when the opaque crystalline Lens is slipt out of its Capsule, and fluctuates behind the Pupil, which TAYLOR then calls a *shaking Cataract*; the Disorder, he says, will now require a different Method of Cure: To explain which he makes the Business of two distinct Chapters, which import no more than that he here passes his Needle as before, into the Eye, directing its Point to the upper and anterior Part of the Cataract, or opaque Cryſtalline, to avoid injuring the ciliary Ligament; and then, with the plain Surface of his couching Needle, he depresses the same to the Bottom of the vitreous Humour.

XXXI. In some Cataracts, which he terms *false*, he says, the Capsule of the Cryſtalline is vitiated, and become opaque, as well as the Lens. The Method of couching both of which, and freeing them from the ciliary Ligament, is related by him in so prolix a Manner, that he again makes it the Business of two whole Chapters. Two other Chapters are again employed in explaining his Operation for the *Glaucoma*: By which Name he understands, contrary to all his Predecessors, an Opacity joined with an Expansion of the crystalline Lens, which, with its vitiated Capsule, are extended or protruded forwards close to the Margin of the Pupil: For the Cure of which he proceeds in the same Manner as before. But I know not what Right or Authority he has, more than his own Assurance, to impose this Name to a Disorder, different from what it has been all along intended to signify by our Predecessors. For it will appear quite unwarrantable even to make, and much more to transfer Names, without an absolute Necessity. Since what he calls a *Glaucoma*, is, I think, a Species of the Cataract, and not a Disorder of the vitreous Humour, seated much deeper in the Eye, as the Antients have all along understood by the Name.

XXXII. We before observed, at N. XXVIII. that those Cataracts which have escaped through the Pupil, may be extracted by an Incision made in the *Cornea*. But I have been assured from *England*, that this famous Oculist there boasted, that

His Treatment of the shaking Cataract.

His Treatment of the false Cataract and Glaucoma.

His Extraction of Cataracts thro' the Cornea.

that he could, and does extract Cataracts in this Manner, which are even fixed behind the Pupil and *Uvea*. But I could never yet learn the Truth of his Assertion, or that he ever performed the Fact.

CHAP. LVI.

Of Dilating CONTRACTIONS of the PUPIL.

Description
of the Dis-
order.

I. **W**E are now to treat of an Operation related to the foregoing, in which the Coats of the Eye are perforated by an Instrument, almost in the same Manner as in couching a Cataract, in order to open an imperforated or contracted Pupil. The Disease we are now speaking of is therefore such a total or close Contraction of the Pupil, that it will not transmit Light enough to the Bottom of the Eye, to enable the Patient to see Objects distinctly. Sometimes this Disorder has grown up from Infancy; and sometimes it arises from an intense Inflammation of the Eye, or some sudden and violent Constriction of the Pupil from other Causes, with a Palsy of the strait Fibres in the *Uvea*; or when the internal Margin of that Membrane, which constitutes the Pupil, is concreted or joined to a Cataract, or to some Part of a Cataract, after the Operation. The Cure of the Disorder is generally esteemed extremely difficult, if not altogether impracticable. But the celebrated Mr. CHESELDEN has contrived a new Method of relieving this Disorder, which he has not only tried several Times with Success, but also described his Process in the *Philosophical Transactions*, and in the *Appendix* to the fourth Edition of his Anatomy: Which we shall therefore give a Place here in our Surgery, as follows:

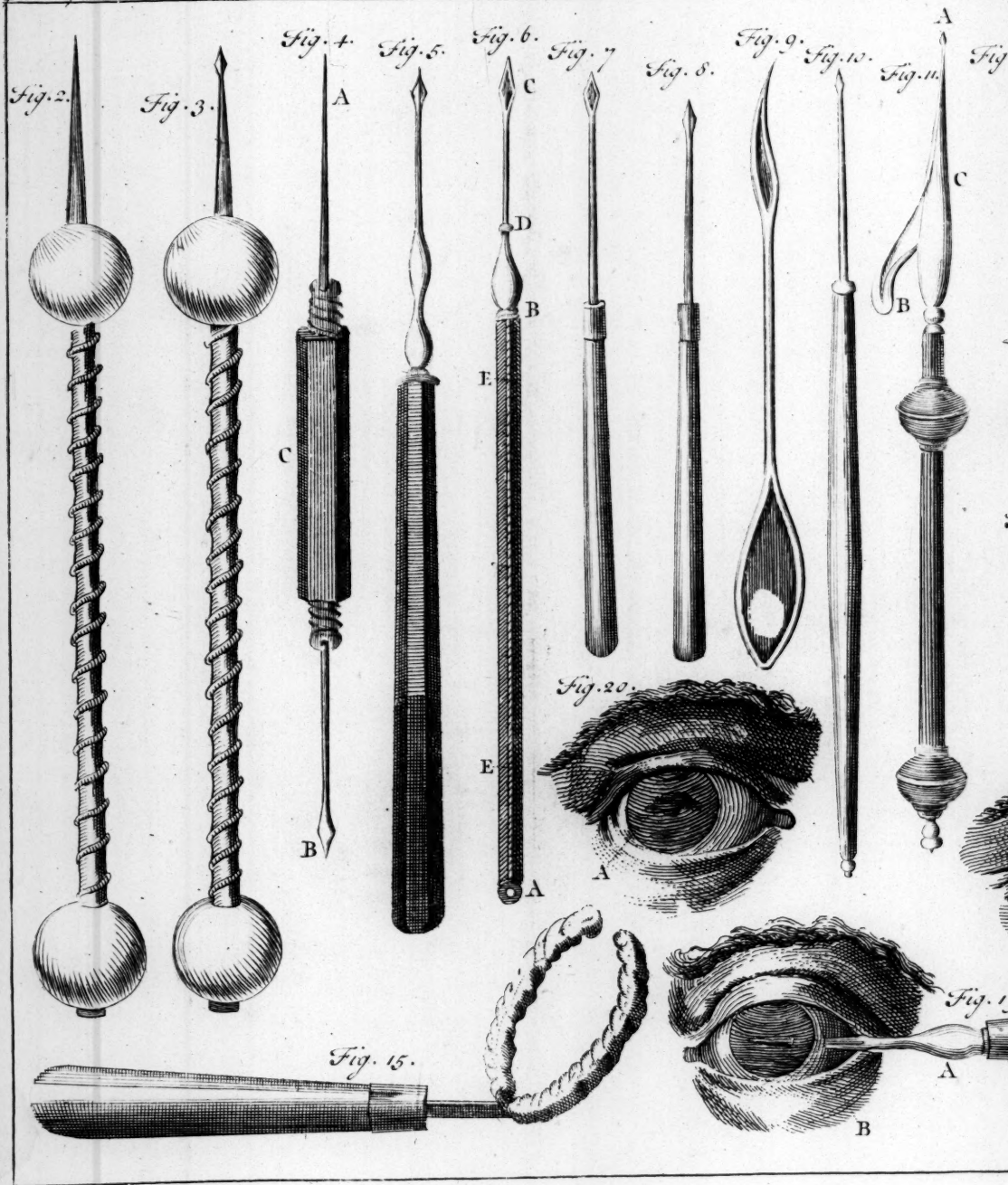
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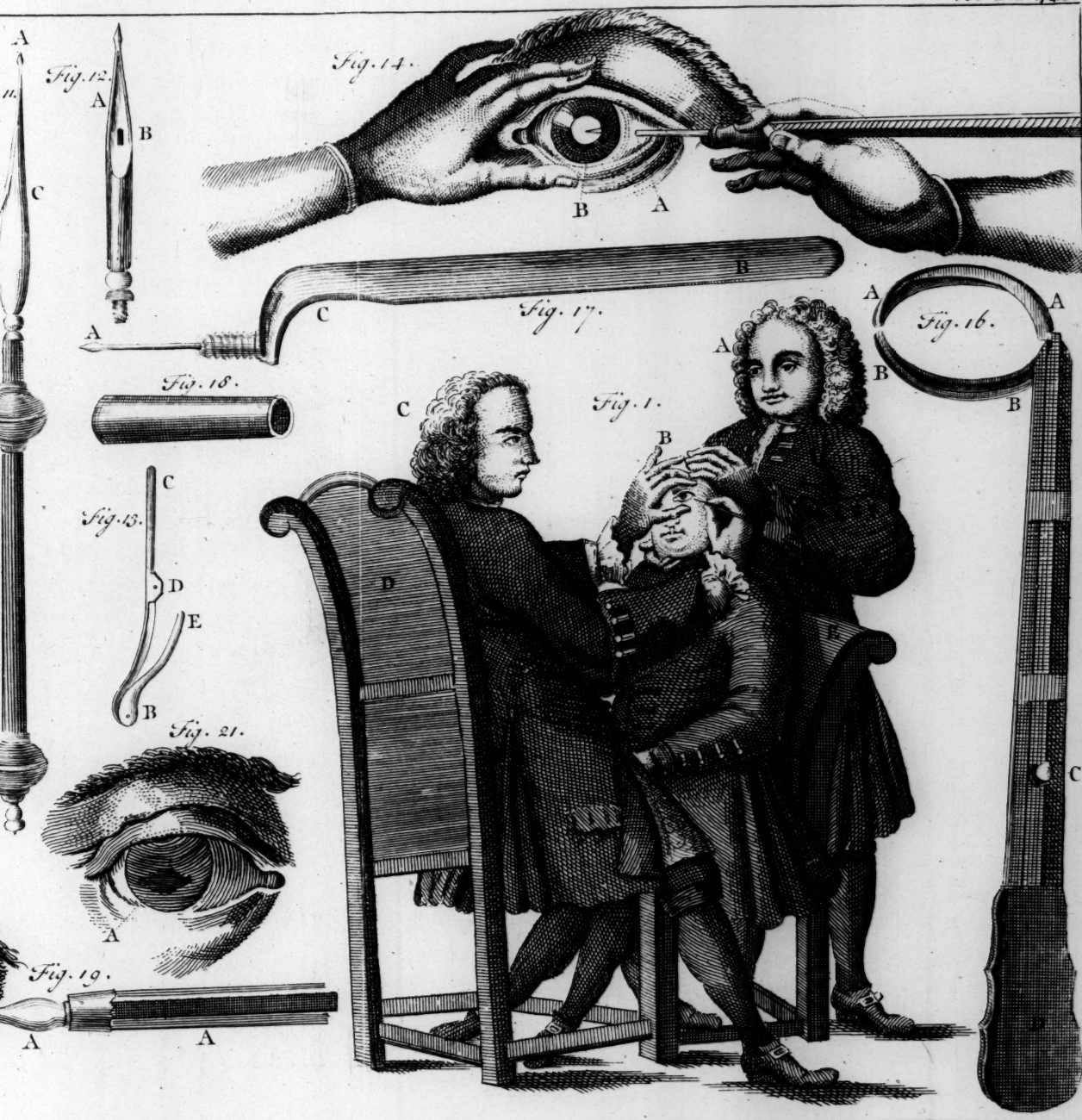
II. The Eye-lids being held open by a *Speculum Oculi*, he then takes a narrow and single-edged Scalpel, or Needle, *Tab. XVII. Fig. 19. AA*, almost like that for couching a Cataract; and passing it through the *Sclerotica B*, as in couching, he afterwards thrusts it forwards through the *Uvea* or *Iris*, and, in extracting it, cuts through the *Iris* in the Manner represented by *Fig. 20. A*. If the Disorder is not accompanied with a Cataract, it will be best to perforate the *Iris* in the Middle, as you may perceive by *Fig. 20*. But when there is a Cataract, the Incision should be made a little higher in the *Uvea*, that the Cataract may not obstruct the Ingress of the Rays of Light. The Cataracts which sometimes accompany this Disorder, he says, are generally very small; and sometimes their Adhesion to the *Iris* is so firm, as to render it impracticable to couch or suppress them. In *Fig. 21*, the Incision or Aperture is represented lower than the Centre of the *Cornea* and *Uvea*; because in this Eye on which he performed the Operation there was an *Albugo*, or white Speck, upon the upper Part of the *Cornea*, which obliged him to incise lower than usual. He does not indeed relate the Manner of treating the Patient afterwards, to suppress and guard against an Inflammation, and other Accidents: But 'tis reasonable to suppose you must proceed in the same Method as after the Operation for a Cataract.

An EXPLANATION of the SEVENTEENTH PLATE.

- Fig. 1.* Demonstrates the Position of the Patient, Surgeon, and Assistant, proper for couching a Cataract as explained in *Chap. LV. N. XVIII.*
Fig. 2, 3. Represents the Silver couching Needles used by the Antients; the first having a slender and round Point like common Needles, and the last a triangular Point.
Fig. 4.







SECT. II. *Explanation of the SEVENTEENTH PLATE.*

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- Fig. 4.* Represents a double-pointed couching Needle; that marked A being round and slender, and that at B a little broader or flatter: C denotes the Handle, which may be made of Silver, Brass, Ivory, or Wood.
- Fig. 5.* Is another Needle with a still broader Point, but sharp-edged; with which a Cataract may be more commodiously held and couched than by a smaller Point.
- Fig. 6.* Denotes another couching Needle, almost like the former, only furnished with a *Sulcus* in its *Apex*, which is recommended by *BRISSAC*, and described more largely at N^o XXVI. of *Chap. LV.*
- Fig. 7, 8.* Represent two Needles from *SOLINGEN* and *NUCKE*, which are said to be invented by the *Dutch* Oculist *SALMASIUS*, and to be both used in one and the same Operation. That at *Fig. 7.* is *fulcated* and sharp-pointed, almost like the preceding, and serves to perforate the Coats of the Eye; from whence *BRISSAC* seems to have taken his at *Fig. 6.* But that at *Fig. 8.* is obtuse, and made so as to pass through the *Sulcus* of the preceding Needle, while it continues in the Eye to depress the Cataract.
- Fig. 9, and 10.* Represent two Needles of pretty much the same Use with the two preceding, and are taken from *BERN. ALBINUS's Disputatio de Cataracta, Francof. impress.*
- Fig. 11.* Denotes the Needle proposed by *ALBINUS*, in his said Treatise, for extracting a membranous Cataract out of the Eye; being so contrived that the Point A opens like a Pair of Pliers, to extract the membranous Cataract, (if there be any in the Eye) by depressing the little Handle B; though I much doubt whether it was ever used with Success.
- Fig. 12, and 13.* Represent the Parts of the preceding Needle separate and asunder. *Fig. 12.* is the *fulcated* Point, in which is lodged the other Point *Fig. 13.* These perforate the Eye the better, as they are more exactly fitted and polished. They are connected by the Hinge B, C, D. *Fig. 11, 12, and 13.* E. *Fig. 13.* denotes a Spring to press the two Points close together, till you open them by depressing it with your Thumb on the little Handle, B. *Fig. 11.* to apprehend and extract the Membrane.
- Fig. 14.* Represents the Method of holding open the Eye-lids with one Hand, and of passing the Needle with your other, for couching a Cataract, the Point B usually appearing through the Pupil.
- Fig. 15, and 16.* Represent two *Specula Oculorum*, to hold the Eyes firm, and open their Lids in couching, and other Operations for the Eyes: The last is more correct than the first, as you may extend or contract the Circle AA, BB, by elevating or depressing the Button C. The Handle is denoted by D.
- Fig. 17.* Represents a Needle for couching a Cataract in the right Eye with the Right Hand. A the Point of the Needle; B its Handle, in which is a particular Kind of Incurvation, C to rest upon the Nose.
- Fig. 18.* Is a Cap or Sheath for including the Point of the said Needle.
- Fig. 19.* Is taken from the *Appendix* to the fourth Edition of *Mr. CHESELDEN's Anatomy*, to shew the Manner of directing his Cutting-needle to open or incise the closed or contracted *Uvea*.
- Fig. 20.* Denotes the Manner of dividing the *Uvea* in its Middle by the same Instrument, to transmit the Rays of Light into the Eye.

Fig. 21. Represents the Manner in which Mr. CHESELDEN pierced the *Uvea* lower than usual, on the Account of an *Albugo*, which infested the Middle of the *Cornea* in this Eye.

C H A P. LVII.

Of the P T E R Y G I U M, or Unguis Oculorum.

Description. I. **W**HEN a preternatural Membrane is formed externally upon the Coats of the Eye, so as to extend itself over the *Cornea* and Pupil, and obstruct the Sight, the Disorder is then usually denominated *Onyx* by the *Greeks*, and *Unguis*, or *Ungula*, by the *Latins*; it is also sometimes named *Pterygium*, from its Resemblance to the Wing of a Bat^a. Sometimes the Pellicle or Film appears red, from the Number of the small Blood-vessels, and then it is usually denominated *Pannus*. It most frequently arises in the Angles of the Eyes from the Temples or Nose, and sometimes from above or below, extending itself, by Degrees, over the *Cornea*, (as in *Tab. XVIII. Fig. 1* and *2. a a.*) Sometimes it only adheres slightly to the *Cornea* by a few slender Fibres; and sometimes again it is extended over the whole Eye, and continues most firmly and intimately attached to it, which usually renders the Case much more difficult to cure.

Cure by
Medicines.

II. While the Pellicle is but recent, and slightly attached, it may be removed by gentle Escharotics; such as Powder *ex Sacchar. Canariens.* 3j. *Vitrioli albi vel Aluminis usti, vel etiam viridis Aëris Gr.* iv. *vel vj.* which must be carefully sprinkled at Intervals by a little at a Time upon the Membrane. Some use a Powder of the *Lapis scissilis*, or of the *Os Sepiæ* mixed with Sugar. But as it will be difficult to use such a Powder for Infants, it will be better to treat them with an Eye-water, as that of *QUERCITAN, cum Vitriol. alb. aut felle Mustelæ piscis, &c.* which may be also used to Advantage for Adults. If the Disorder is accompanied with an Inflammation, it will be convenient for you to treat the Patient accordingly, by Bleeding, Blisters, and cooling Medicines. M. ST. YVES sets a great Value on the *Lapis medicamentosus Crollii*, dissolved in Water, and used to wash the Eye; though, in my Opinion, a Solution of *Vitriol. alb. ʒss. in Aqua Chelidonii major.* 3ij. is little inferior, if at all.

Cure by the
Scalpel.

III. If the mild Escharotics, before proposed, are insufficient for destroying the Pellicle, you must then extirpate it. In order to which, the Patient must kneel down on his left Knee, if the right Knee be affected, and lean his Head back against the Light upon the Surgeon's Lap, or Knees, who then takes the small Hook, *Tab. XVIII. Fig. 3.* or *Tab. XV. Fig. 30.* and, after the Eye-lids are held open by an Assistant, endeavours to pass its Point under the thickest or loosest Part of the Pellicle, to elevate it a little. In the next Place, he takes the Needle *a*, armed with a Thread, *Fig. 1. bb.* and passing it under the Pellicle, ties it with a double Knot: And then fastening the two Ends in a Loop, *Fig. 2. bc.* he thereby attempts to make a gentle Elevation. This done, he now endeavours to separate the upper and lower Margin of the Membrane

^a CELSUS, *Lib. VII. Cap. 7. N° IV.* and CASTEL. *Lex. Med. per BRUNO. sub tit. ONYX.*

with

with a Lancet, that he may afterwards cut off the rest immediately in a straight Line near the lacrymal Caruncle by a Pair of small and straight Scissors. He then draws back the Thread and Membrane towards the *Cornea*, and if it adheres any where to the Eye, frees it by Degrees with a Scalpel or Scissors: In doing which, the Operator must have a principal Regard to two Things: 1. To avoid injuring the *Cornea*; and, 2. To observe that no Part of the Membrane be left adhering to the Eye; which last might occasion a Return of the Disorder. Yet it is better to leave some Part of the *Unguis* adhering to the *Cornea*, when its Separation is extremely difficult, than to wound the *Cornea*, and leave irremediable Scars in it: And this the rather, because any small Portion of the Membrane left behind may be taken off afterwards, by treating the Eye two or three Times in a Day with the gentle Escharotics before proposed at N^o II. Though there are some, who rather approve of the following *Collyrium* for removing the membranous Reliques:

R. Aq. Rosar. Damascenar. Plantag. ana. ℥j. Matr. Perlar. pp^t ʒj. Sacchari Saturni Gr. vj. Vitrioli albi Gr. iij. M. f. Collyr.

M. ST. YVES approves of washing the Eye for three or four Days afterwards with *Sp. Vini* diluted with Water, and then to use a Solution of the *Lapis medicamentosus* in Spring-water. Lastly, in extirpating the Pellicle, great Care must be taken not to cut off any Part of the lacrymal Caruncle, and much more not to remove the whole of it: For, if this Body be wanting in the greater *Cantus* of the Eye, where it stops and directs the Tears into the *Puncta lacrymalia*, the Patient will consequently be troubled with a watery Eye, in which the lacrymal Humour will run down over his Cheek.

IV. Some of these Pellicles which appear red, from the small Blood-vessels extended to them from the Corners of the Eyes, will wither or easily fall off with the Use of Medicines, upon scarifying and dividing those Vessels in the *Cantus* of the Eye which feed and nourish them. Sometimes the *Cornea* is incrusted over with a glutinous Matter, like Fat or a Membrane, which may be readily scowred off with the Gall of an Eel, Lamprey, or the Bile of some other Animal. This was probably the Case of TOBIAS, mentioned in the *Old Testament*. Sometimes indeed we meet with Membranes of this Nature, which are inseparable from the *Cornea* by any means whatever. But this we cannot be assured of before Trial: And we ought rather to try the Operation in vain, than to relinquish the Disorder, unjustly, as incurable. Lastly, some Pellicles upon the Eye are extremely painful and stubborn, inclining to a cancerous Disposition: And these it may be best for the Surgeon to relinquish as incurable.

V. When the *Pterygium* or *Unguis* is extended over the whole Eye, it will be convenient to divide it by a cruciform Incision into four Parts, according to M. ST. YVES, and then to separate each of them from the *Cornea* and Eye; (as we before directed for the *Unguis* in general) conducting the remainder of your Dressing as we there prescribed.

VI. Lastly, when this Operation is to be performed upon the left Eye, the Patient should rise up from the Ground as soon as the Needle has been passed through the Membrane, and the Threads tied: For, being placed in a Chair, the Opera-

tor may have a better Command of the Eye than before ; except he should happen to be as active with his Left Hand as with his Right. If the Membrane appears to be thin and weak, Care should be taken not to extend it too forcibly by the Thread, lest it should break.

C H A P. LVIII.

Of the Albugo, Leucoma, Nebula, Nubecula, and other SPOTS in the Cornea of the EYE.

Description I. **A**S in several other Classes of Disorders belonging to the Eye, so in this we meet with a great deal of Confusion, by a Misapplication and Replication of several Names, which are often used to import the same Disease ; whence arise Difficulties and Mistakes to the Learner, and Errors in the Method of Cure. However, we find that the most eminent Surgeons and Physicians intend, by these Names, or Sort of whitish Spots in the *Cornea* ; though they appear not always alike, and of the same Kind, being sometimes larger or smaller, thicker or thinner, or more or less protuberant. According to their different State and Condition they more or less obscure the Sight, and sometimes wholly intercept it. Hence we have also a Reason why the blemish was sometimes called *Leucoma* by the *Greeks*, and *Albugo* by the *Latins*, or *Nebula* and *Nubecula* ; according as it appeared darker or clearer.

Causes. II. The Causes of these Blemishes are various. For they may arise, 1. from an Obstruction of the pellucid Vessels in the *Tunica cornea*, and an Inspissation of their contained Juices, proceeding from a violent Inflammation of the Eye : Or, 2. from a Suppuration, and then an Induration of these Juices in the *Cornea* after an Inflammation, so that it, by Degrees, becomes more opaque, as it hardens, and puts on a whitish Hue, being sometimes mistaken for an *Unguis*^a. 3. These Spots may arise from an external Erosion or Ulcer in the *Cornea* ; or, 4. from Pustules or *Vesiculæ* in various inflammatory Disorders ; particularly, 5. from those which are occasioned by the Small-Pox. 6. They may very often proceed from the Scars left after a Puncture in the *Cornea*, from a Sword, Knife, Fork, a Splinter, Glass, a Thorn, or the like, Or, 7. from a Burn ; or, 8. the corroding Acrimony of caustic Substances falling into the Eye. Lastly, 9. they may sometimes be formed of a peculiar Tunic growing to the Eye itself.

Prognosis. III. These Disorders of the *Cornea* are some more and some less difficult to remove, according to their Duration, and the particular Causes from whence they proceed, with the Patient's Age, and other Circumstances. Infants may be more easily freed from them than Adults, when they are not of any long standing. But for those which are Scars formed from Wounds, Burns, Punctures, or the like, there is little or no Hope of removing them.

Methods of Cure. IV. If any one is desirous to be successful in removing these Spots, he must adapt his Method of Cure to the Cause of the Disorder. For those which arise

^a See Chap. LVII. and LX. Likewise MAUCHART'S Treatise.

from inspissated Humours betwixt the *Laminæ* of the *Cornea*, and are not of long standing, may be best removed by a proper Regimen, attenuating Diet, and Medicines, especially a plentiful Use of those Decoctions and Infusions which are sudorific. But then at the same time must be used externally Phlebotomy, Scarification, Blisters, and frequent washing of the Feet. Upon the Eye itself may be also applied discutient Bags *ex fol. Hyssop. Rbrismarin. flor. Chamom. Sem. fœnic. &c.* boiled in Wine or Water, and frequently laid on the Eye; or a Collyrium *ex Aq. fœnic. cum Sp. Vin. Campb.* Lastly, it may be convenient for the Patient to hold his Eye sometimes over the warm Vapours of Coffee, or a Decoction of the Woods. On the contrary, it will be here pernicious to use cold and astringent Collyria; especially those of white Vitriol, though they are much esteemed: Whereas warm Applications are found by Experience to be of the greatest Service. When the Inflammation is dispersed, the Patient may wet his Eye every Day with some of the *Aqua Ophthalmica Quercitani, cum Tutia pp.* made warm before using it. If any of the small Veins proceeding to the Spot appear turgid on the White of the Eye, it will be proper to divide them by the double-edged and crooked Needle (*Tab. I. Fig. 5. or Tab. XVI. Fig. 2.*) a Lancet or Scissors. Lastly, in some of them which are of long standing, you may rather expect any thing than their Cure.

VI. In those whitish Spots which proceed from Abscesses, or a Suppuration of Matter after an Inflammation betwixt the *Laminæ* of the *Cornea*, which they elevate like a Pea, or Pearl, (whence they are sometimes called *Pearls*) you should make an Incision into the *Cornea*, to discharge the included Matter; which might otherwise by Degrees erode the *Cornea*, and destroy the Sight. Your Incision for this Purpose may be made either by the Lancet, or by a couching Needle, *Tab. XVII.* through the *Cornea* quite to the Abscess; and repeated, if there be Occasion: Treating the Eye afterwards with some of the discutient Medicines proposed at N^o V. Others use Vipers Fat, to cleanse or heal the Puncture or Incision, and, by this Means, the Sight is sometimes happily restored. But when the Matter is lodged deep, and not near the Outside of the *Cornea*, it will be impossible to preserve the Eye-sight distinct and perfect, either by this, or any other Means.

VII. But when the *Cornea* is eroded externally, either from an Abscess, Inflammation, or any other Cause, the following Method is taken by M. ST. YVES. First, he removes the Inflammation, and then orders the Patient to wash his Eye frequently with the *Aqua viridis ophthalmica Hartmanni*, which is made weaker or stronger, according as the Patient can bear it: The admirable Virtues of which Water for removing Spots in the *Cornea*, are strongly recommended by the same Author.

VIII. In some of those ardent or inflammatory Pustules of the *Cornea*, which appear afterwards whitish and protuberant, like a Pearl or Grain of Millet, the best and most expeditious Method of removing them is, by perforating with a Needle, so as to discharge their contained Matter. And in those Pustules arising from the Small-Pox, you ought to make an Apertion by a Needle or Lancet, immediately to discharge the eroding Matter, removing the Pellicle afterwards with some *Alumen ustum cum Sacchar. cand. & Ovor. test. pp.* applied every Day to the *Cornea*. Others use Tinder, or burnt Lint dipt in Oil. By either of which

Cure of
Spots and
Abscesses.

Cure of an
Albugo
from an ex-
ternal Ero-
sion of the
Cornea.

Cure of
those from
Burns, or the
Small-pox.

which the remaining Film will, by Degrees, vanish, according to ST. YVES, (pag. 229.) The same Method of Cure must be taken for discharging the Matter in Pustules formed in the *Cornea* from Burns; treating the Blemish afterwards with the Medicines we have directed in Chap. LVII. preceding.

Incurable
Spots.

IX. Those Spots of the *Cornea*, which arise from Wounds, Scars, or the Abuse of the vitriolic *Collyria*, are seldom curable: As are those also which render the *Cornea* quite opaque, and are of very long standing, or in which the natural Form of the Eye or *Cornea* are destroyed. In these Cases it is therefore much better to leave the Patient to himself unmolested, than to torture his Eyes to no Purpose, by a tedious Course of Remedies and Operations.

CHAP. LIX.

Of the STAPHYLOMA.

A Staphylo-
ma de-
scribed.

I. UNDER the Term *Staphyloma*, (the *Grape*) are chiefly comprised two Disorders of the Eyes: One, in which the *Cornea* is more than usually protuberant, as in Tab. XVIII. Fig. 4, 5, 6, 7 and 8: The other, in which the Pupil or *Uvea* breaks forth and forms an unsightly Tumor on the *Cornea*, either from internal Causes, or from some wounding Instrument forced through the Coat; in which last Case the Sight of the Eye is usually destroyed. See Fig. 8. a a.

Kinds.

II. There are various Species and Denominations of the *Staphyloma*, according to their Size and Shape: As the *Margarita*, *Myocephalus*, *Clavus*, *Mylon*, *five Pomum*, and the *Staphyloma*, or *Acinus* strictly so called; of all which the biggest is the *Mylon*. But I have sometimes observed not only the *Cornea*, but also the *Sclerotica* preternaturally distended, and enlarged to a great Degree after the same Manner as a *Hernia ventralis*, or, the lacrymal Sack, and then the Disorder may be also denominated *Staphyloma*, because those two Coats, the *Cornea* and *Sclerotica*, are properly constituted but of one. However, it may be just to distinguish those Tumors from each other, according to the different Parts affected, by denominating one of them *Staphyloma Scleroticae*, and the other *Staphyloma Corneae*.

Prognosis.

III. A *Staphyloma* is a dangerous Disorder, as well because it greatly deforms the Eye, and destroys its Sight, as because it often induces most violent Inflammations, Head-achs, Restlessness, Abscesses, and sometimes a Cancer in these Parts. The Cure of it is therefore generally undertaken, not so much to recover the Sight, as to preserve or restore the Uniformity of the Eye, and prevent the malignant Symptoms before enumerated.

Cure of a
recent Sta-
phyloma.

IV. In the Cure of this Disorder we must relieve the Tumor and Deformity of the *Sclerotica* and *Cornea*, by the Application of a Compress dipt in *Aqua aluminis*, together with a Plate of Lead and Bandage, or some proper compressing Instrument. If the *Uvea* protrudes itself through a Wound in the *Cornea*, it should be returned by a Probe. The Patient in the mean time must lie in a supine

supine Posture, and the Wound be constantly dressed with the White of an Egg, or Mucilage of Quince-seeds, till it is healed: By which Means the Patient often recovers his Sight.

V. If the Disorder is become inveterate, and inflexible to all Remedies, you must pass a Needle with a double Thread through the Middle of the Tumor, as in *Fig. 8. Tab. XVIII.* Then the two Ends of the Thread are to be tied together in a Knot, first on one Side, and then on the other: By which Means the Tumor will gradually wither, and, at length, fall off together with the Threads.

Cure of an
inveterate
Staphyloma.

VI. But as this Ligature frequently occasions violent Pain, Inflammation, and sometimes a Suppuration of the Eye; it would seem to be a more safe and expeditious Method to extirpate the Tumor by the Scissors or Scalpel. In this Manner I myself once cut off a Protuberance of this Kind at the Root, from the Eye, of the length of one's Finger, by a Pair of Scissors.

Another
Method.

VII. M. ST. YVES's Method of removing these Protuberances, (see his Treatise, p. 233.) when they have not wholly covered and obscured the Cornea, is to pass a crooked Needle and Thread of Silk through the Middle of the *Staphyloma*: After removing the Needle, he twists together the Thread, and extends them with his Left Hand; while, with a Scalpel or Lancet, he frees the Tumor under the Ligature, till he can, at length, totally extirpate it by the Scissors. Lastly, he applies a Compress over the disordered Eye, dipt in *Sp. Vini*, diluted with Water, as was observed in treating of the Cataract. And thus not only the *Staphyloma* is removed, but the Cornea itself becomes perfectly healed, or else leaves but a very small Aperture in the Middle of the Wound: From whence indeed the aqueous Humour is continually discharged as fast as it is secreted in the Eye, but without any Trouble or Uneasiness to the Patient; because it flows gently with the Tears through the lacrymal Passages into the Nose.

The Method
of M. St.
YVES.

VIII. When the whole Cornea is infested with a *Staphyloma*, as in *Fig. 4, 5, 6, 7.* the most expeditious Method of Cure is that of ST. YVES, by cutting out circularly not only the Cornea, but also the Iris or Uvea, all round within a Line of the Ring, by which it touches the *Albuginea*: After which, all the Humours of the Eye falling out, the remaining Coats contract themselves into a smaller Compass, and the Wound itself will gradually heal up. You must then provide the Patient with an artificial Eye, adapted in Size, Shape, and Aspect, to supply the Place of that which is wanting. In this Manner the artificial Eye may frequently be moved from one Side to the other by the remaining Muscles of that Organ, so that many cannot discern it to be an artificial, but will take it for a true or natural Eye: And in this last Method I myself have cured the *Staphyloma*.

A second
Method of
ST. YVES.

CHAP. LX.

Of the HYPOPYON.

Description. I. **W**E frequently meet with a Collection of purulent Matter immediately under the *Cornea*, in the Place of the aqueous Humour: Which Disorder is generally denominated *Hypopyon* or *Pyosis*^a. The *Hypopyon* arises from an Extravasation of Blood or Matter in this Part, which may happen after a violent Inflammation, the Small-Pox, couching a Cataract, or from other external Injuries of the Eyes from Violence, as Contusion, from a Blow or Fall, a Burn, &c. It is at the Beginning very often attended with excruciating Pains both of the Head and Eyes: And, according to the Degree of Injury, is soon after followed either with Blindness and a Destruction of the Eye, or Death itself.

Cure.

II. There are chiefly three Methods of treating this Disorder. The first and mildest is by dispersing the Matter with discutient Remedies; such as the Application of Compresses dipt in a Decoction of Sage, Eye-bright, Hyssop, and Fennel-seeds in Wine, or of little Bags stuffed with the same Ingredients, and boiled in Wine, which are to be frequently renewed: By which Means, when the Blood or Matter is in no great Quantity, the Eye recovers its former Integrity and Action, as I have frequently experienced. Therefore you should continue the Patient in this Method so long as you find any Benefit from it, even till the corrupt Matter or Blood is all dissipated or dispersed. But, if the Pain and other Symptoms are rendered more intense by these Applications, you must proceed immediately to the Operation. Otherwise, there will be great Danger of the contained Matter's eroding the *Cornea*, and destroying the internal Parts of the Eye, which will induce Blindness after the most intense Pains.

Cure by agitating the Head.

III. But before we treat of the Operation, it may be proper to describe the Method of Cure, which, we read, was formerly used with Success by JUSTUS, an eminent Oculist in the Time of GALEN, who himself was an Eye-witness of his Practice, as he writes in the End of his XIVth Book *De Methodo Medendi*. In the first Place, he seated the Patient on a Sort of Chair over-against himself; then taking hold of his Head with both Hands, he shook it about very assiduously, till all the purulent Matter disappeared: In which Operation it is very remarkable, that GALEN himself testifies, the Spectators could perceive the corrupt Matter gradually subsiding to the Bottom of the Eye. Most People will be apt to reject this Method, as useless and ridiculous: But my Opinion is, that it may be often very effectual in removing the *Hypopyon*. In this I am confirmed, not only by the Authority of GALEN, but also from my own Experience

^a Indeed M. St YVES names this Disorder of the Eyes *Onyx*; the *Hypopyon*, according to him, being a Suppuration in the *Tunica Cornea* itself: So that an *Onyx*, or *Unguis*, may arise from an *Hypopyon*, when the Matter of the last erodes into the *Cornea*, by destroying its internal *Camella*. See his Treatise *De Morb. Oculor.* Part II. Cap. 9. pag. 221, & seq. Hence we may see how much even some of our modern Surgeons and Oculists are at Variance in their ascertaining the Disorders of the Eyes and their Names.

in a Patient who, being just entered under my Care for an Hypopyon, was obliged to take a Journey in a Chariot; by the repeated shaking and jolting of which, upon his Return the next Day, I found all the purulent Matter dispersed: And, without doubt, it was subsided or thrown down behind the Uvea. It may therefore not be improper to try this Practice before the chirurgical Operation by the Hand and Instruments. But before you shake the Head, it will be proper to dispose it, or the Patient's whole Body, in a supine Posture, and to press the Eye, first, with the Fingers, in order to loosen and remove the Matter. But, when the Disorder is great and obstinate, the purulent Matter being too copious, or too firmly fixed to be dispersed in this Manner, Recourse must then be had to the Operation long ago described and recommended by GALEN, ÆTIUS, and others of the Antients: Which has met with so much Neglect among our modern Surgeons and Oculists, that it would scarce have been known or heard of at present, if it had not been restored in the last Century by RIVERIUS, MEEKREN, NUCKE, and BIDLOW.

IV. Preparatory to the Operation, your Patient must be placed and seated Method of operating. against the Light, with his Head and Hands firmly secured each by an Assistant, as in couching a Cataract. Then the Surgeon himself depresses the lower Eyelid, while an Assistant elevates the upper. The Operator now takes a Lancet, and therewith cautiously incides through the *Cornea*, below the Pupil, and about the Space of a Line from the *Albuginea*, making his Apertion big enough to discharge the Matter with the aqueous Humour; but with Caution at the same time to avoid wounding the *Uvea* behind the Matter. If the Matter does not discharge freely of itself, you must assist it by a gentle Pressure and Agitation with your Fingers: And in about three or four Hours after the Operation, you must dress the Eye with a Compress dipt in a Collyrium *ex Aq. Plantaginis vel Rosar. & Albo Ovor.* or a Mucilage *ex Sem. Cydonior.* prepared, either of them, with or without Camphor. By this Means you will find the Wound in the *Cornea* quickly healed, and the aqueous Humour soon after restored, with the Patient's Sight, if none of the internal Parts are injured. And though there may remain a small *Cicatrix* in the *Cornea*, yet that being made lower than the Pupil, will cause very little, if any, Impediment to the Sight. In the mean time, to perform this Operation with the Lancet safely, you ought to involve that Instrument in Lint, or a Piece of Plaster, so as to leave not above a Straw's Breadth of its Point uncovered, that it may not run too far into the Eye. MEEKREN has on this Account invented an Instrument purposely for the Operation, published in the Tenth Chapter of his Chirurgical Operations, and delineated in our *Tab. XVIII. Fig. 10.*

V. Sometimes the purulent Matter is found too much inspissated to be easily discharged through the Incision made by the Lancet in the *Cornea*: And in that Case it will be more convenient to use the Needle, *Tab. XVIII. Fig. 12.* which we have elsewhere proposed for making Setons. For the recurve Point of this Needle is not only less apt to wound the *Uvea*, but by its triangular Figure it also makes a larger Aperture, which will more readily discharge the inspissated Matter: But then we usually involve this Needle almost up to its Point in a Slip of some Plaster, as I before advised you to do the Lancet. PLATNERUS has given

M m m

us

us the Figure of a particular Instrument for this Purpose^a, having a Sort of triangular *Apex*, the Invention of which he ascribes to Mr. WOOLHOUSE. See our *Tab. XVIII. Fig. 13.* When the Matter included under the *Cornea* is too thick to flow out of itself, or by Pressure, M. ST. YVES^b proposes to wash it out by injecting with a small Syringe, repeating the Operation every Day, till it be all removed: And then you may proceed to heal the Wound in the *Cornea*. If any Inflammation appears, the Patient should be bled, blistered, scarified, and the affected Parts treated with a discutient Fomentation, and other proper Medicines.

C H A P. LXI.

Of Inciding the CORNEA, to discharge Extravasated BLOOD.

When the
Operation is
necessary.

I. **B**LOOD extravasated in but a small Quantity from external Violence, or Injuries offered to the Eye; may be generally dispersed and carried off by the discutient Remedies before proposed at N^o II. of the preceding Chapter. But when the Quantity is larger than can be thus removed, you ought immediately to open the *Cornea* by Incision, as we directed in the preceding Chapter, to prevent the stagnant Blood from suppurating and destroying the Eye.

An Instance
of this Pra-
ctice.

II. But lest any body should think I propose of my own Head a rash and unheard-of Practice, I shall give the Reader an Instance of it (from the *Hist. Acad. Paris. An. 1709. pag. 16. Edit. Amstel.*) in which it succeeded very well. Therefore, whenever any Person has, by some external Violence, had so much Blood extravasated in his Eye, as to destroy his Sight, and be incapable of Dispersion, it is the Advice of the Physician GANDOLPHUS, to have Recourse to this Practice. He therefore instantly made a transverse Incision through the *Cornea*, and, by that means, happily discharged the extravasated Blood, in such a Manner, that the Patient was cured with hardly any Pain, and without any deforming *Cicatrix*, so that he recovered his former Sight without any Defect: And yet he was obliged to perforate the *Cornea* three Times, by reason of the Quantity and strong Adhesion of the Blood. To promote the healing of the Incision, he, for the Space of eight Days, applied Compresses dipt in a Mixture of *Aq. Plantag. ℥iv. & Aq. Vulneraria ℥ij.* In little more than a Week's Time, the Cure was so well performed, that one could perceive no Difference betwixt the Eye that had undergone the Operation, and the other which had not; excepting only that it's Pupil was a little larger than the other, which seems to have been rather the Effect of the Blow than of the Operation.

^a *Dissert. de Fissulâ lacrymali.*

^b *De Morb. Ocul. p. 227.*

C H A P. LXII.

Of the DISTENTION and PROLAPSUS OCULI, also the FUNGUS and CANCER.

I. SOMETIMES the Eye is so violently inflamed and swelled, that it cannot be contained in its Orbit or Socket by the Lids, but protrudes itself out of its natural Seat. This is a Disorder attended not only with great Deformity, but also with intense Pains, and frequently Blindness or an obstinate Cancer. How ghastly the Disorder appears, may be perceived, I think, from the Figures we have given of it in *Tab. XVIII. Fig. 14, 15^a*. PAREY mentions a Case he saw, in which the Eye was so vehemently distended by pernicious Humours, that it at last burst out of its proper Coats; and the like may be also seen in MUYS, *Dec. II. Obs. I.* This is termed by the Greeks a *Proptosis*, and by the Latins a *Prolapsus Oculi*: But by some it is denominated an *Hydrophthalmia*, and by others *Escophthalmia^b*, when the Eye is very much distended with a watery Humour; but the more modern Authors have, from its Similitude, named the Disorder, *Oculus Bovinus aut Elephantinus*. Though I must confess that many of these Names are rather intended to signify different Diseases than one and the same; whence Error and Confusion. The Causes of this Disorder are various, being sometimes from a violent Inflammation, or a Redundancy of Humours in the Eye, from an Obstruction of the reductory Vessels; sometimes from a *Scirrhus*, Cancer, or some external Violence. The Instances given us by HILDANUS, *Cent. I. Obs. I.* MUYS, *Dec. XII. Obs. 1.* and by me, in *Tab. XVIII. Fig. 15.* seem to have been from a Cancer: And more Instances of the same Kind may be seen in STALPART, VANDER WIEL, *Part II. Obs. 9.* and in the other Writers of Observations. Lastly, there are some Surgeons and Physicians who denominate this Disorder *Ficus* or *Fungus*, which are in reality different Diseases.

II. When the Disorder is recent, and the Figure of the Eye is not yet deformed, those Humours, producing the *Hydrophthalmia*, may be generally dispersed by Bleeding, Purging, and Vescicatories, with internal Attenuants and Diluents, and external discutient Fomentations. But, if the Case is too obstinate to yield to Remedies, you must have Recourse to the surgical Operation of *Paracentesis*, as in other dropical Cases. This *Paracentesis* must be made either with a Lancet, or a small *Trocar*, to discharge the offending Humours, repeating the Discharge every Day, or every other Day, or as often as shall be found necessary. At every Dressing, a concave Plate of Lead, with a Compress dipped in some discutient Liquor, (see *Chap. LX. N. II.*) should be firmly secured upon the Eye, to recover its natural Figure. By carefully

Nature of
the Disorder.

Cure by Discutients or Puncture.

^a Vid. BARTISCHIIUS in *Chirurg. Ocular.* p. 218. and HILDAN. *Obs. I.*

^b Vid. NUCKE *De Ducl. Aquos.* p. 119. & 120. STALPART. VANDER WIEL, &c.

observing this Method, NUCKE^a cured a Patient of an *Hydrophthalmia*, though he made his *Paracentesis* in the *Cornea* itself: But as that may leave an ugly *Cicatrix* in the *Cornea*, I rather make my Perforation with a Lancet in the *Sclerotica* than in the *Cornea*. After discharging the Humours, I dress the Eye with Lint dipt in *Aq. Rosar. & Album. Ovor. permist.* defend it with the Leaden Plate, and then apply my Compress dipt in *Sp. Vini*; and lastly, my Bandage, not neglecting Internals at the same time, till the Eye is cured, and recovers its State.

Cure by the Scalpel.

III. When the natural Figure of the Eye and its Office of Vision are destroyed, and the Pains become more and more intense, there then remains but one, and a lamentable Method, of relieving the Patient, by making a transverse Incision through the Coats of the Eye, and discharging the contained Humours: Which done, and the Eye deterged as in other Ulcers, you must cover the Eye-lids with Compress and Bandage. But if, after the Humours are discharged, the Eye remains larger than can be easily covered with the Eye-lids, it will be necessary to cut off so much as is redundant with the Scalpel or Scissors: By which Means the Deformity may be afterwards the better concealed by an artificial Eye. Sometimes the Surgeon may cut out the *Cornea* by a circular Incision, in this Disorder, as we proposed in the *Staphyloma*, Chap. LVIII. preceding.

Another Method of Cure.

IV. BARTISCHUS, HILDANUS, and MUYS, have contrived a crooked Scalpel, like a Spoon for extirpating the Eye when it is thus disordered: But, upon mature Consideration, I believe the Surgeon will not stand in need of any such Instrument. For, to say nothing of the Difficulty you will meet with in sharpening and using such an Instrument, it will be found, in most Cases, sufficient to extirpate only the redundant or tumified Part of the Eye, which prevents the Eye-lids from closing: To which you may add, the Danger there will be of wounding and uncovering the thin Bones which compose the Orbit, by this crooked Scalpel. But if ever the Surgeon shall find it necessary to extirpate the whole Eye for a *Scirrhus*, or cancerous Disorder of it, he may perform the same with equal Advantage by the strait Scalpel, *Tab. XII. Fig. 14.* which is the same I used in extirpating those ghastly Tumors of this Kind, represented in *Tab. XVIII. Fig. 14, and 15.* Though there are some Surgeons who think it the mildest Practice to free the Eye so far from its Orbit by a Scalpel, till you can make a Ligature about the Protuberant Part in order to remove it, by that Means, like other Excrescences. But the more prudent in the Profession generally prefer any Method to this, because of the intense Pain, Inflammation, and Convulsions, which, by this Means, torture and often kill the Patient. Therefore whenever you meet with the Eye infested, even to its Root, with a *Scirrhus* or Cancer, there is no safer Method of relieving the Patient from his painful Disorder, than by extirpating it clean out from the Orbit, in the Manner performed by HILDANUS and MUYS; deterging and healing the Wound afterwards in the usual Method.

^a Lib. *De Duſſ. Oculor. aquos.* pag. 120. and VALENTINI in *Misc. Nat. Cur.* Ann. VI. Obs. 70.

V. It sometimes happens in this Disorder, that after having performed the Operation, a new fleshy Excrescence sprouts up over the Eye, and forms a fresh Tumor: To prevent which, you must dress with Lint dipt in *Aq. Phagedenica*, and make a pretty tight Deligation over the Leaden Plate with which you are to cover the Eye. It may be here also observed, that Cancers of the Eye, like the same Disorder in other Parts, will very often return, after they have been seemingly cured by the Operation and Treatment here proposed, and may be again removed by the same Practice; as appears from the Observation of *Muys*, before cited. Lastly, when the Disorder arises from a *Caries*, or *Spina ventosa* of the Bones themselves composing the Orbit, if it will not give way to Mercury (as it often does) the Physician must then be content to palliate the Disorder, relieve the Pains, and prevent its bad Consequences: For a total Removal thereof is frequently altogether impracticable.

C H A P. LXIII.

Of ARTIFICIAL EYES.

I. **T**HE Loss of an Eye is frequently occasioned by a Wound, an Abscess <sup>Their Com-
position.</sup> in the Small-Pox, or an Operation in Surgery: And then the unhappy Patient is desirous of concealing his Misfortune by an artificial Eye, which is contrived to hide the Deformity arising from this Accident. The modern artificial Eyes are made of concave Plates of Silver, Gold, or Glass stained or enameled, so as to resemble the natural Eye. See *Tab. VII. Fig. 1.* The nearer it approaches the sound Eye in Size and Appearance, the more firmly it will stay under the Eye-lids, and the more easily deceive the Spectator. But it will be frequently necessary for the Patient to wipe his artificial Eye clean, lest if any Gum or Sordes should gather upon it, the Fallacy might be thereby discovered: To prevent which, it may be also proper for him to be provided with several of these artificial Eyes, that if one should happen to be lost, broke, or disfigured, its Place may be immediately supplied with another. Upon going to Bed, it is proper to dismount the artificial Eye, and to replace it again under the Eye-lids, after he wakes in the Morning. But then, that the artificial Eye may be taken out and put in with Neatness and Conveniency, the Surgeon must take care to remove so much of the disordered Eye, as will make Room for receiving the artificial.

II. It is here to be observed, that the more closely the artificial Eye is compressed by the Eye-lids, and by the diseased Eye, the more perfectly it will perform the Motions of the natural Eye, which it will receive from the remaining Muscles which agitate the diseased Globe. It is therefore not without Reason that we before advised the Surgeon to remove no more of the Eye than what was preternaturally projected beyond its anterior Part: Except when a *Scirrhus* or

or Cancer should require an Extirpation of the whole; and then indeed it cannot be expected that the artificial Eye should have any other Motion than what it receives from the Lids.

It is sometimes better to be without them.

III. I have several Times observed some of these artificial Eyes produce Pain, Inflammation, Tears, and other Inconveniencies, by irritating the Parts which are not of a proper Conformation, or when the artificial is not right shaped; so that they will often inflame, weaken, and destroy the Sight of the sound Eye. In such Cases, it will be best for the Patient either to provide himself with an artificial Eye which is better adapted, or else totally to relinquish the Use of them, rather than lose the Use of both Eyes.

C H A P. LXIV.

Of the STRABISMUS, or SQUINTING.

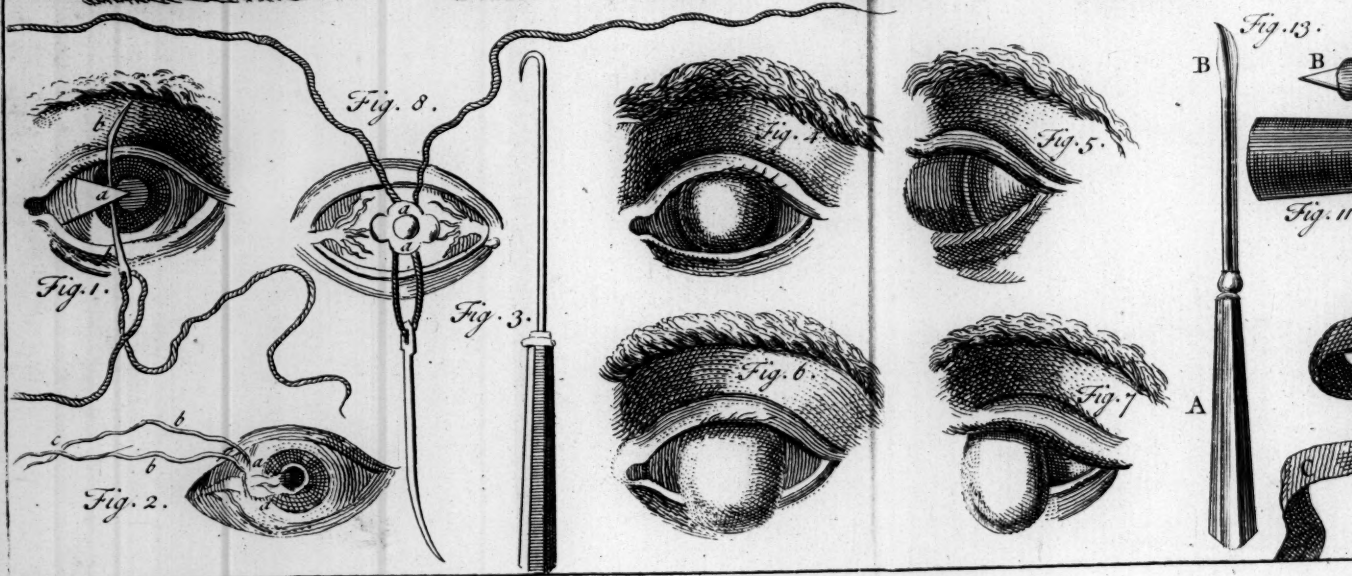
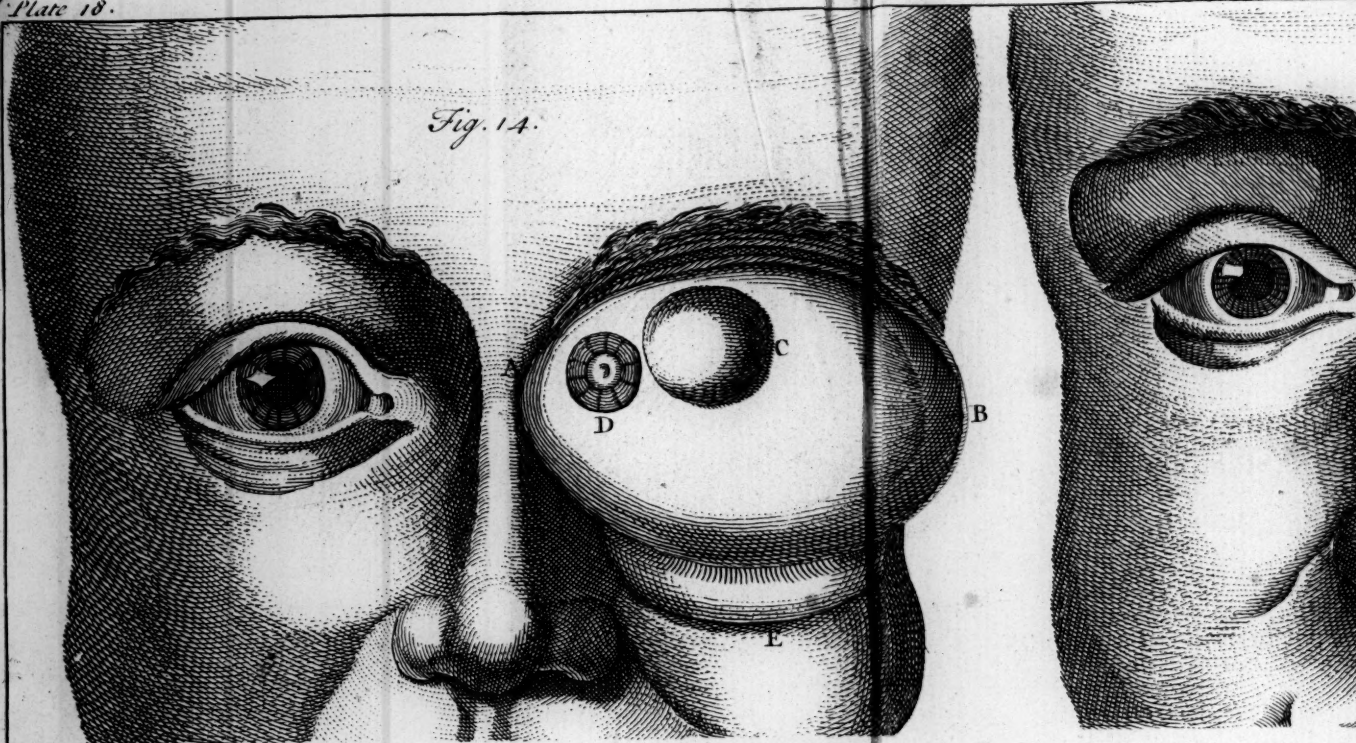
Causes.

I. **W**E frequently meet with Persons whose Eyes, when they look upon any thing, are distorted, or turned towards the outer or inner Corners of their Eye-lids, instead of being directed towards the Object: Which is the Disorder commonly termed *Strabismus*, or *Squinting*. Sometimes only one Eye, but more frequently both are thus affected. The Disorder is frequently caused in Infants, from letting them constantly suck at one and the same Breast, or placing them in the Cradle, so that they always look the same Way towards the Light or Window. By this repeated Action, the Muscles on that Side become too strong and powerful to be balanced by the rest which counter-act them on the other Side of the Eye; whence it is contorted, or looks obliquely. But this Disorder is more frequently caused in Infants from convulsive and epileptic Motions; to which the Muscles of their Eyes, as well as of their other Limbs, are extremely subject. Lastly, it may proceed as well in Adults as Infants, from a Spasm and Rigor, or from a Palsy in one or two of the Muscles of the Eye, as also from a Defect or Insensibility in some Part of the *Retina*. For when that Part of the *Retina* which is opposite to the Pupil, and receives the Impression of the Object, is from any Cause rendered insensible, the Patient is then obliged to turn his Eye obliquely, till the Pupil directs the Rays from the Object upon some other sound Part of the *Retina*, in order to see the same.

When and how it may be cured.

II. Squinting is a Disorder which is hardly ever cured without Difficulty, more especially when in Adults, and caused by some Defect in the Muscles or *Retina* of the Eye (especially if the Disorder arises from a bad Habit only.) But in young Infants you will probably succeed, according to the Advice of M. ST. YVES, by frequently placing them before a Looking-glass, that their Eyes may be directed towards the Image of their own Face. Those more advanced in Years may be assisted by reading very small Writing, or inspecting very minute Objects, provided you direct them to turn their Eyes even, and to bathe them at Times with *Aq. Hungar.* or anoint them with the *Balsamum Flavrantii*. There are others who propose to cure this Disorder with a Sort of Mask

Fig. 14.





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Sect. II. *Explanation of the EIGHTEENTH PLATE.*

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Mark or Eye-swath, as in *Tab. XVIII. Fig. 16.* taken from SOLINGEN, and described more particularly in the Explanation of the following Table. This Method is also recommended by BARTISCHIUS in his *Ophthalmoduleia*, pag. 15, 16 and 17. But, lest Infants should look strait through the Aperture with only one Eye, and squint in the mean time with the other, it will be best to bind up one Eye till the other is rectified, and then to correct the other in the same Manner; which is seldom practicable, through the Unruliness of Infants, and other Impediments.

An EXPLANATION of the EIGHTEENTH PLATE.

- Fig. 1.* Denotes an *Unguis a* on the Eye, with the Method of passing a Needle and Thread under it *b b*, for its Removal.
- Fig. 2.* Represents another *Unguis*, or *Pterygium a a*, with a Thread tied round it *b b*, and at their Extremities tied in the Knot *c*, to form a Loop for extending and elevating the same: But that the Thread may not slide upon the Film, it is first tied with the double Knot *a*.
- Fig. 3.* Represents a Hook used in separating Films, and other Tubercles, from the Eye.
- Fig. 4.* Denotes a front View of a *Staphyloma*, or Protuberance of the *Cornea*, which I cured.
- Fig. 5.* Gives a lateral View of the same *Staphyloma*.
- Fig. 6.* Represents a front View of another larger and more depending *Staphyloma*, which I cured.
- Fig. 7.* Gives a lateral View of the same.
- Fig. 8.* Is a lesser *Staphyloma*, marked *a a*, with a double Thread passed under it, from SOLINGEN.
- Fig. 9.* A *Scalprum*, to scrape or exfoliate carious Bones in the *Fistula lacrymalis*, from PLATNERUS's Dissertation *De Fist. lacr.*
- Fig. 10.* Represents MEEKREN's Instrument for perforating the *Cornea* in an *Hypopyon* AA the Handle; B the Scalpel, or rather the Point of a double-edged Scalpel, having a Button or Protuberance at its Basis, to prevent the Point from entering too deep into the Eye: C the Screw by which the *Cap-sula* or Case, *Fig. 11.* is fastened on.
- Fig. 12.* Denotes a large Needle which may serve to make Scions; but is here designed to perforate the *Cornea* if you secure it from entering too deep, by involving it in a Slip of Plaster up to A.
- Fig. 13.* Represents an Instrument designed to perforate the *Cornea* in an *Hypopyon*. A denotes the Handle, B the triangular Point a little crooked, almost like the preceding Needle; which should, like that, be involved in a Slip of Plaster up to the Point, to prevent its entering too far beyond the *Cornea*.
- Fig. 14.* The Letters AB denote a scirrhus Eye, enlarged to the Size of an Hen's Egg, upon which is a blackish Tubercle, like a Grape, marked C; and D denotes the vitiated Pupil and *Cornea*. E the lower Eye-lid depressed by the Tumor.

Fig. 15.

Explanation of the EIGHTEENTH PLATE.

Fig. 15. Denotes a larger Fungus of the left Eye, weighing half a Pound, which, with the preceding, I extirpated and cured in 1721, the particular Nature and Treatment of which I shall describe in my *Cbirurgical Observations*, which I intend shortly to publish.

Fig. 16. Represents a Bandage to cure the Disorder of Squinting in Children. L. AA. two concave Plates of Silver, Ivory, or Ebony, perforated in the Middle: L. CC the Bandage by which they are fixed to the Eyes. Children are, by this Method, practised to direct their Eyes strait forward through the Apertures, and thereby acquire a regular Habit.

The END of the FIRST VOLUME.

